Test No. 15-539: Fibers Analysis

This test was sent to 189 participants. Each sample set consisted of pieces of two "known" yarn samples and one item of "questioned" fibers. Participants were requested to compare the items and report their findings. Data were returned from 151 participants (79.9% response rate) and are compiled into the following tables:

This report contains the data received from the participants in this test. Since these participants are located in many countries around the world, and it is their option how the samples are to be used (e.g., training exercise, known or blind proficiency testing, research and development of new techniques, etc.), the results compiled in the Summary Report are not intended to be an overview of the quality of work performed in the profession and cannot be interpreted as such. The Summary Comments are included for the benefit of participants to assist with maintaining or enhancing the quality of their results. These comments are not intended to reflect the general state of the art within the profession.

Participant results are reported using a randomly assigned "WebCode". This code maintains participant's anonymity, provides linking of the various report sections, and will change with every report.

Manufacturer's Information

Each sample pack consisted of two sections of known yarn (Items 1 and 2) and a set of questioned fibers (Item 3). Items 2 and 3 were from the same purple yarn labeled as 100% acrylic, whereas Item 1 was from a different purple yarn labeled as 70% viscose and 30% silk. Both yarns were purchased from a local craft store. Participants were requested to examine the fibers, identify the fiber type, and determine if the questioned fibers could have originated from the known yarn.

SAMPLE PREPARATION-
The outside of the yarn skein was rolled with a lint roller to remove any extraneous debris. Items 1 and Items 2/3 were prepared at different times to prevent any possibility of cross-contamination.

ITEM 1 (ELIMINATION): For the known yarn (Item 1), one inch sections were cut from the skein. They were then packaged into a glassine bag and a pre-labeled Item 1 envelope.

ITEMS 2 AND 3 (IDENTIFICATION): For the known yarn (Item 2) and the questioned fibers (Item 3), one inch sections of yarn were cut from the same skein. One of these one inch sections of yarn was packaged into a glassine bag and a pre-labeled Item 2 envelope. From another one inch section of yarn, approximately 15-20 fibers were teased out and packaged into a glassine bag and a pre-labeled Item 3 envelope. Items 2 and 3 were taken in close spatial proximity to one another, within 4 feet, and were kept together as an identification group and packaged as described below.

SAMPLE PACK ASSEMBLY: For each sample pack, an Item 1, 2, and 3 were placed in a sample pack envelope and sealed with invisible tape. This process was repeated until all of the sample pack envelopes were prepared. Once verification was completed, the sample pack envelopes were sealed with evidence tape and initialed with "CTS".

VERIFICATION: Predistribution laboratories met consensus on association and fiber identification results. The following procedures were used to examine the items: Stereomicroscopy, comparison microscopy, polarized light microscopy, macroscopic examination, IR/FTIR, microspectrophotometry, fluorescence microscopy, solubility, microchemical tests, ALS-fluorescence, and cross-section analysis.

Summary Comments

This test was designed to allow participants to assess their proficiency in the examination, identification and comparison of fibers. Participants were provided with a 1" section of known yarn for Items 1 and 2, as well as a set of questioned fibers for Item 3. They were requested to examine the submitted items and determine if the questioned fibers could have originated from either of the known items. Items 2 and 3 were from the same yarn labeled as 100% acrylic, whereas Item 1 was from a different purple yarn labeled as 70% rayon and 30% silk. (Refer to the Manufacturer's Information for preparation details.)

In Table 1, 150 (99.3%) participants reported that Item 3 could not have originated from Item 1 and one participant did not report a response. It was reported by 149 (98.7%) participants that Item 3 could have originated from Item 2. For the remaining participants, one reported that Item 3 could not have originated from Item 2 and one participant did not report a response.

In Table 2, a consensus could not be reached on the generic fiber type of Item 1. As a result, inconsistent data for Item 1 were not highlighted. It was reported by 107 (70.9%) participants that Item 1 consisted of rayon and silk. Of the remaining participants, 32 (21.2%) reported various other generic fiber types and 12 participants did not report a generic fiber type. For Item 2, 148 (98.0%) reported that it consisted of acrylic fibers. Of the remaining participants, two participants reported other generic fiber types and one participant did not report a generic fiber type. For Item 3, 149 (98.7%) reported that it consisted of acrylic fibers and two participants reported other generic fiber types.

Association Results

Could the questioned fibers (Item 3) have originated from either the victim's hat (Item 1) and/or the victim's scarf (Item 2)?

TABLE 1

WebCode	Item 1	Item 2	WebCode	Item 1	Item 2
22KRDV	No	Yes	676XFM	No	Yes
27Y979	No	Yes	699WPU	No	Yes
286ZRU	No	Yes	6BYN8R	No	Yes
2ETD2V	No	Yes	6D7743	No	Yes
2FLB6V	No	Yes	6DM83Y	No	Yes
2GXB2P	No	Yes	6MCBTX	No	Yes
2JXJ7Z	No	Yes	6QV6U6	No	Yes
2QL726	No	Yes	74XVC4	No	Yes
2RV89X	No	Yes	7BXDNU	No	Yes
3369W3	No	Yes	7BXFEY	No	Yes
33U37T	No	Yes	7FRC26	No	Yes
3GQDCC	No	Yes	7M6BM3	No	Yes
3NRQBU	No	Yes	7NMARD	No	Yes
3P4EPZ	No	Yes	7PTX6H	No	Yes
3QF96Z	No	Yes	7U8B76	No	Yes
3T82NX	No	Yes	7V3VXB	No	Yes
46CQVX	No	Yes	8WRQTH	No	Yes
47NDEX	No	Yes	97WX7X	No	Yes
48GD93	No	Yes	9QVLBX	No	Yes
49WQYK	No	Yes	9UJVMK	No	Yes
4N8JFW	No	Yes	A8Z8DK	No	Yes
4R8HY2	No	Yes	AGQTJJ	No	Yes
64XLWZ	No	Yes	AQG64C	No	Yes

TABLE 1

WebCode	Item 1	Item 2	WebCode	Item 1	Item 2
ARA6WG	No	Yes	FFYQEP	No	Yes
ATJCXN	No	Yes	FKPB7C	No	Yes
B2VLAN	No	Yes	FN94HE	No	Yes
BA779D	No	Yes	FZMZMJ	No	Yes
BBUN3J	No	Yes	FZZU2X	No	Yes
BHFC73	No	Yes	G28G8B	No	Yes
BN9ECM	No	Yes	GAMA6R	No	Yes
BP4Z4T	No	Yes	GBGYP9	No	Yes
BTHVJQ	No	Yes	GCTM3T	No	Yes
BURPFQ	No	Yes	GTGTJZ	No	Yes
C4RYYK	No	Yes	H34AMU	No	Yes
CBA8MG	No	Yes	HDMJBN	No	Yes
CCMU6V	No	Yes	HDXRV9	No	Yes
CUQ6D9	No	Yes	HNXBG9	No	Yes
CXJD93	No	Yes	HQKYQN	No	Yes
D66JRV	No	Yes	HTDNGW	No	Yes
DCGZYV	No	Yes	HULVLA	No	Yes
DERR6Q	No	Yes	HYZCEM	No	Yes
DYDJ6M	No	Yes	J9ZLXG	No	Yes
E3YFJ6	No	Yes	KM3E3Y	No	Yes
E4M22U	No	Yes	KRTPEH	No	Yes
F2BJHP	No	Yes	M34XV8	No	Yes
F4G7VT	No	Yes	MAGDB7	No	Yes
F9EJ2R	No	Yes	MCQWLC	No	Yes
FBYP2E	No	Yes	MXVFWE	No	Yes
FEJEKR	No	Yes			

TABLE 1

WebCode	Item 1	Item 2
N7YWWJ	No	Yes
NDYDAA	No	Yes
NECZRP	No	Yes
NPVLTD	No	Yes
NV29Q9	No	Yes
P2HB2H	No	Yes
P4RZQL	No	Yes
P7C8NM	No	Yes
PAYKXQ	No	Yes
PTAG9A	No	Yes
PVVBV3	No	Yes
PZAQNF		
Q48R2H	No	Yes
QATPRQ	No	Yes
QBRTK2	No	Yes
QCEGUF	No	Yes
QG9DJ7	No	Yes
QPN8GN	No	Yes
QQYYP6	No	Yes
QRBVTN	No	Yes
R77CHM	No	Yes
R8YHLJ	No	Yes
REHTPM	No	Yes
RHLGCP	No	Yes
RNA3KB	No	Yes
RP33DF	No	Yes
RPHCC9	No	Yes
RZLETY	No	Yes
TGMG7X	No	Yes
TLGDT4	No	Yes
TMQKUB	No	Yes
TQRL3K	No	Yes
TUQXZ7	No	Yes
TZYFYY	No	Yes
U928TK	No	Yes
U9K9WY	No	Yes
UQNG33	No	Yes
UXNXD8	No	Yes
UZRD3Y	No	Yes
W48RJ4	No	No
W84BL3	No	Yes
W8BEJM	No	Yes
WDA83G	No	Yes
WLZT9F	No	Yes
WYCUDL	No	Yes
XEHGXZ	No	Yes
XTLYTT	No	Yes
Y33CY3	No	Yes
Y6T4HZ	No	Yes
ZDGJJA	No	Yes
ZJP3KM	No	Yes

TABLE 1

WebCode	Item 1	Item 2	WebCode	Item 1	Item 2
ZM4FKB	No	Yes			
ZU7M4J	No	Yes			
ZYLZ68	No	Yes			

Response Summary Participants: 151

	Item 1	Item 2
Yes:	0 *(0.0%)*	149 *(98.7%)*
No:	150 *(99.3%)*	1 *(0.7%)*
Inc:	0 *(0.0%)*	0 *(0.0%)*
No Response:	1 *(0.7%)*	1 *(0.7%)*

Fiber Type Determination

What is the fiber type and generic name of the fiber(s) in each item?

TABLE 2

WebCode	Item 1	Item 2	Item 3
22KRDV	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
27Y979	Manufactured, 2 types of fibers both Rayon	Manufactured, Acrylic	Manufactured, Acrylic
286ZRU	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
2ETD2V	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
2FLB6V	Manufactured, Rayon and other type fiber not identificated[sic]	Manufactured, Acrylic	Manufactured, Acrylic
2GXB2P	Manufactured, Rayon	Manufactured, Acrylic	Manufactured, Acrylic
2JXJ7Z	Manufactured, Rayon (Animal, silk-like)	Manufactured, Acrylic	Manufactured, Acrylic
2QL726	Fiber 1: Natural polymer (Rayon), Fiber 2: Natural Fiber (Silk)	Artificial fiber, synthetic polymer, acrylic	Artificial fiber, synthetic polymer, acrylic
2RV89X	Manufactured, Rayon/regenerated cellulose; Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
3369W3	Mixture of two manufactured fibers - rayon and nylon	Manufactured fibers - acrylic	Manufactured fibers - acrylic
33U37T	Manufactured, Rayon; Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
3GQDCC	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
3NRQBU	Rayon and Animal (Silk)	Acrylic	Acrylic

TABLE 2

WebCode	Item 1	Item 2	Item 3
3P4EPZ	Manufactured, Rayon	Manufactured, Acrylic	Manufactured, Acrylic
3QF96Z	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
3T82NX	Multiple fiber types; Not identified in accordance with lab policy	Manufactured, Acrylic	Manufactured, Acrylic
46CQVX	Manufactured (Rayon), Animal (Silk)	Manufactured (Acrylic)	Manufactured (Acrylic)
47NDEX	Manufactured, Rayon / Animal, silk	Manufactured, Acrylic	Manufactured, Acrylic
48GD93	Manufactured (Rayon), Animal (Silk)	Manufactured (Acrylic)	Manufactured (Acrylic)
49WQYK	Manufactured, Rayon; Manufactured, Nylon	Manufactured, Acrylic	Manufactured, Acrylic
4N8JFW	Manufactured, Rayon	Manufactured, Acrylic	Manufactured, Acrylic
4R8HY2	Silk, Rayon (Animal, Manufactured)	Acrylic (Manufactured)	Acrylic (Manufactured)
64XLWZ	Manufactured - Rayon, Animal - Silk	Manufactured, Acrylic	Manufactured, Acrylic
676XFM	Manufactured, Acrylic	Not Applicable	Manufactured, Acrylic
699WPU	Manufactured, Rayon	Manufactured, Acrylic	Manufactured, Acrylic
6BYN8R	Animal - Silk; Manufactured, Rayon	Manufactured - Acrylic	Manufactured - Acrylic
6D7743	Manufactured, Rayon + Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
6DM83Y	Manufactured, Rayon & Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic

TABLE 2

WebCode	Item 1	Item 2	Item 3
6MCBTX	animal, silk and Manufactured, Rayon	Manufactured, Acrylic	Manufactured, Acrylic
6QV6U6	Manufactured: Rayon and Azlon	Manufactured: Acrylic (AN:VA)	Manufactured: Acrylic (AN:VA)
74XVC4	manufacturer-regenerated cellulosic (Rayon) and natural - protein (silk)	Acrylic	Acrylic
7BXDNU	Manufactured, Rayon & animal, silk	Manufactured, Acrylic	manufctured[sic], Acrylic
7BXFEY	Manufactured, Rayon; animal, silk; animal, silk	Manufactured, Acrylic	Manufactured, Acrylic
7FRC26	Manufactured, Rayon; Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
7M6BM3	Manufactured Blend, Rayon & Silk & or wool	Manufactured, Acrylic	Manufactured, Acrylic
7NMARD	Animal, Silk; Manufactured, Rayon	Manufactured, Acrylic	Manufactured, Acrylic
7PTX6H	Manufactured, Rayon & Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
7U8B76	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
7V3VXB	Manufactrured[sic], Rayon: Animal, Silk	Manufactrured[sic], Acrylic	Manufactrured[sic], Acrylic
8WRQTH	Manufactured, Viscose and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
97WX7X	Manufactured, Rayon AND Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
9QVLBX	Manufactured, Rayon; Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
9UJVMK	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic

TABLE 2

WebCode	Item 1	Item 2	Item 3
A8Z8DK	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
AGQTJJ	Manufactured, Rayon	Manufactured, Acrylic	Manufactured, Acrylic
AQG64C	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
ARA6WG	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
ATJCXN	Manufactured, Azlon; Manufactured, Rayon	Manufactured, Acrylic	Manufactured, Acrylic
B2VLAN	Manufactured, Rayon AND Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
BA779D	Animal, Silk and Manufactured, Rayon	Manufactured, Acrylic	Manufactured, Acrylic
BBUN3J	Animal, Silk; Manufactured, Rayon (Viscose)	Manufactured, Acrylic (Vinyl Acetate type)	Manufactured, Acrylic (Vinyl Acetate type)
BHFC73	Manufactured, Rayon & Animal, silk	Manufactured, Acrylic	Manufactured, Acrylic
BN9ECM	Manufactured, Rayon (Viscose); Animal, Silk	Manfactured[sic], Acrylic	Manufactured, Acrylic
BP4Z4T	animal - silk; Manufactured - Rayon	Manufactured - Acrylic	Manufactured - Acrylic
BTHVJQ	Manufactured, Rayon; Animal, Wool	Manufactured, Acrylic	Manufactured, Acrylic
BURPFQ	Mixture: Manufactured, Rayon and animal, silk	Manufactured, Acrylic	Manufactured, Acrylic
C4RYYK	Animal, Silk & Manufactured Rayon (Vicose). Rayon not confirmed	Manufactured Acrylic	Manufactured Acrylic
CBA8MG	Manufactured, Rayon	Manufactured, Acrylic	Manufactured, Acrylic

TABLE 2

WebCode	Item 1	Item 2	Item 3
CCMU6V	Manufactured, Rayon; Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
CUQ6D9	Manufactured/VISCOSE Rayon (major fibres blended with other fibres)	Manufactured/Acrylic	Manufactured/Acrylic
CXJD93	Not Applicable	Manufactured, Acrylic	Manufactured, Acrylic
D66JRV	Animal, Silk; Manufactured, Rayon	Manufactured, Acrylic	Manufactured, Acrylic
DCGZYV	Manufactured, Rayon; Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
DERR6Q	Manufactured, Rayon & Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
DYDJ6M	Manufactured, Rayon and Polyester (trace amounts)	Manufactured, Acrylic	Manufactured, Acrylic
E3YFJ6	Animal, Silk / Manufactured, Cellulosic Fibres Modal/Viscose	Manufactured, Polyacrylnitril-VinylAcetate	Manufactured, Polyacrylnitril-VinylAcetate
E4M22U	Manufactured, Rayon; Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
F2BJHP	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
F4G7VT	Manufactured-Rayon, Animal-silk	Manufactured- Acrylic	Manufactured- Acrylic
F9EJ2R	Animal, silk; Manufactured, Rayon	Manufactured, Acrylic	Manufactured, Acrylic
FBYP2E	Manufactured, Rayon; Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
FEJEKR	Manufactured, Rayon; Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
FFYQEP	Manufactured, Rayon and Animal	Manufactured, Acrylic	Manufactured, Acrylic

TABLE 2

WebCode	Item 1	Item 2	Item 3
FKPB7C	Manufactured Synthetic Rayon	Manufactured Acrylic	Manufacture Acrylic
FN94HE	Manufactured, Rayon; Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
FZMZMJ	Manufactured, Rayon	Manufactured, Acrylic	Manufactured, Acrylic
FZZU2X	Animal, Silk and Manufactured, Rayon	Manufactured, Acrylic	Manufactured, Acrylic
G28G8B	N/A	Manufactured, Acrylic	Manufactured, Acrylic
GAMA6R	Manufactured - Blend	Manufactured - Acrylic	Manufactured - Acrylic
GBGYP9	Manufactured, Rayon; Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
GCTM3T	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
GTGTJZ	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
H34AMU	Manufactured, Rayon; Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
HDMJBN	Manufactured, Rayon/ possible Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
HDXRV9	Manufactured, Rayon & Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
HNXBG9	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
HQKYQN	Not Applicable	Acrylic	Acrylic
HTDNGW	Manufactured/Rayon; Animal/silk	Manufactured/Acrylic	Manufactured/Acrylic

TABLE 2

WebCode	Item 1	Item 2	Item 3
HULVLA	Animal - silk, Rayon - Manufactured	Acrylic - Manufactured	Acrylic - Manufactured
HYZCEM	Manufactured, Rayon/animal, silk	Manufactured, Acrylic	Manufactured, Acrylic
J9ZLXG	Manufactured, Rayon; Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
KM3E3Y	Animal, silk; Manufactured, Rayon	Manufactured, Acrylic	Manufactured, Acrylic
KRTPEH	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
M34XV8	Undetermined-Microscopically inconsistent with Item 3	Manufactured-Acrylic	Manufactured-Acrylic
MAGDB7	Manufactured, Rayon; Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
MCQWLC	Manufactured, Rayon; Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
MXVFWE	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
N7YWWJ	Manufactured, Rayon + Animal Silk	Manufactured, Acrylic	Manufactured, Acrylic
NDYDAA	Manufactured, Acetate (probably) + Vegetable, Cotton	Manufactured, Acrylic (probably)	Manufactured, Acrylic (probably)
NECZRP	Manufactured, Rayon; Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
NPVLTD	Animal, Silk; Manufactured, Rayon	Manufactured, Acrylic	Manufactured, Acrylic
NV29Q9	Manufactured, Rayon; animal, silk	Manufactured, Acrylic	Manufactured, Acrylic
P2HB2H	Manofactured[sic] (Rayon viscose) and animal (silk)	Acrylic	Acrylic

TABLE 2

WebCode	Item 1	Item 2	Item 3
P4RZQL	Manufactured, Rayon; Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
P7C8NM	Manufactured - Nylon / Manufactured - Rayon	Manufactured Acrylic	Manufactured Acrylic
PAYKXQ	Manufactured, Rayon and Vegetable, Cotton	Manufactured, Acrylic	Manufactured, Acrylic
PTAG9A	Rayon, manufactured	Acrylic, manufactured	Acrylic, manufacture
PVVBV3	Animal, Silk-Mulberry silk; Manufactured, Rayon	Manufactured, Acrylic	Manufactured, Acrylic
PZAQNF	Manufactured Rayon/Animal Silk	Manufactured Acrylic	Manufactured Acrylic
Q48R2H	Manufactured, Rayon / Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
QATPRQ	Regenerated, Rayon and Animal, Silk (tentatively identified)	Manufactured, Acrylic	Manufactured, Acrylic
QBRTK2	Three type of Manufactured, Rayon	Manufactured, Acrylic	Manufactured, Acrilic
QCEGUF	N/A	Manufactured, Acrylic	Manufactured, Acrylic
QG9DJ7	Blended: Vegetable (Cotton) and Manufactured (Nylon)	Acrylic fibre - Manufactured	Acrylic fibre - Manufactured
QPN8GN	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
QQYYP6	Animal, Silk and Manufactured, Regenerated Cellulose	Manufactured, Acrylic	Manufactured, Acrylic
QRBVTN	Not Applicable	Manufactured, Acrylic	Manufactured, Acrylic
R77CHM	Manufactured Rayon and Animal, likely silk	Manufactured Acrylic	Manufactured Acrylic

TABLE 2

WebCode	Item 1	Item 2	Item 3
R8YHLJ	Manufactured, Rayon/Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
REHTPM	Not Applicable	Manufactured, Acrylic	Manufactured, Acrylic
RHLGCP	Polyamide - Manufactured, Viscose Rayonne - Manufactured	Acrylic - Manufactured	Acrylic - Manufactured
RNA3KB	Blend - Manufactured, Rayon and Animal, Silk (Natural, Animal, Silk per Forensic Exam. of Fibers)	Manufactured, Acrylic	Manufactured, Acrylic
RP33DF	Manufactured, Rayon; Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
RPHCC9	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
RZLETY	Manufactured, Rayon; Manufactured, Azlon	Manufactured, Acrylic	Manufactured, Acrylic
TGMG7X	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
TLGDT4	Manufactured, Rayon + animal, silk	Manufactured, Acrylic	Manufactured, Acrylic
TMQKUB	Manufactured, Rayon & Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
TQRL3K	Manufactured, Rayon; Animal, silk	Manufactured, Acrylic	Manufactured, Acrylic
TUQXZ7	manufatured[sic], Rayon & animal, silk	Manufactured, Acrylic	Manufactured, Acrylic
TZYFYY	Animal, Silk Manufactured, Rayon	Manufactured, Acrylic	Manufactured, Acrylic
U928TK	Not Applicable	Manufactured, Acrylic	Manufactured, Acrylic
U9K9WY	Manufactured (Rayon), Vegetable (Cotton), Animal (Silk)	Manufactured, Acrylic	Manufactured, Acrylic

TABLE 2

WebCode	Item 1	Item 2	Item 3
UQNG33	Manufactured: Rayon; Natural: Silk	Manufactured: Acrylic	Manufactured: Acrylic
UXNXD8	Multiple fiber types noted. No further analysis in accordance with Laboratory Policy	Manufactured, Acrylic	Manufactured, Acrylic
UZRD3Y	Animal, Silk or Manufactured, Azlon and Manufactured, Rayon	Manufactured, Acrylic	Manufactured, Acrylic
W48RJ4	Manufactured Fiber: Rayon	Manufactured Fiber: Acetate	Animal Fiber: Wool
W84BL3	Manufactured, Rayon; Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
W8BEJM	Silk and Rayon	Acrylic	Acrylic
WDA83G	Manufactured, Rayon + Silk	Manufactured, Acrylic + Rayon	Manufactured, Acrylic + Rayon
WLZT9F	Manufactured, Rayon & Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
WYCUDL	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
XEHGXZ	Manufactured, Rayon; Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
XTLYTT	Manufactured, Rayon; Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
Y33CY3	Manufactured, Rayon, Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
Y6T4HZ	Animal, Silk; Manufactured, Rayon	Manufactured, Acrylic	Manufactured, Acrylic
ZDGJJA	Animal, Silk; Manufactured, Rayon; Vegetable, Cotton	Manufactured, Acrylic	Manufactured, Acrylic
ZJP3KM	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic

TABLE 2

WebCode	Item 1	Item 2	Item 3
ZM4FKB	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
ZU7M4J	Manufactured, Rayon and Animal, Silk	Manufactured, Acrylic	Manufactured, Acrylic
ZYLZ68	Vegetable and Manufactured (generic type not determined since it was an exclusion)	Manufactured, Acrylic	Manufactured, Acrylic

Response Summary Participants: 151

Item 1*			Item 2			Item 3		
Rayon and Silk:	107	*(70.9%)*	Acrylic:	148	*(98.0%)*	Acrylic:	149	*(98.7%)*
Other:	32	*(21.2%)*	Other:	2	*(1.3%)*	Other:	2	*(1.3%)*
Generic type not determined:	12	*(7.9%)*	Generic type not determined:	1	*(0.7%)*			

** A consensus could not be reached on Item 1, therefore inconsistent results have not been highlighted.*

Examination Methods

TABLE 3

WebCode	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	Other
22KRDV	✓	✓	✓	✓	✓	✓	✓				
27Y979	✓	✓	✓		✓	✓			✓		
286ZRU	✓		✓		✓	✓			✓		
2ETD2V	✓	✓	✓	✓	✓	✓	✓		✓		
2FLB6V	✓	✓	✓		✓						Dyes extraction
2GXB2P	✓	✓	✓		✓	✓					
2JXJ7Z	✓	✓	✓		✓	✓					
2QL726	✓	✓	✓	✓		✓	✓				Spectroscopy RAMAN
2RV89X	✓	✓	✓	✓	✓	✓					
3369W3	✓		✓								
33U37T	✓	✓	✓		✓	✓	✓		✓		TLC
3GQDCC	✓	✓	✓	✓	✓	✓	✓		✓	✓	
3NRQBU	✓	✓	✓	✓	✓	✓	✓				
3P4EPZ	✓		✓			✓					
3QF96Z	✓	✓	✓		✓	✓					
3T82NX	✓	✓	✓	✓	✓	✓	✓	✓	✓		
46CQVX	✓		✓			✓	✓				
47NDEX	✓	✓			✓	✓	✓		✓		
48GD93	✓	✓	✓	✓	✓	✓	✓	✓	✓		Berek Compensator
49WQYK	✓	✓	✓		✓	✓	✓				
4N8JFW			✓			✓					
4R8HY2	✓	✓	✓		✓	✓	✓				
64XLWZ	✓			✓		✓			✓		
676XFM	✓	✓	✓	✓	✓	✓	✓				

TABLE 3

WebCode	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	Other
699WPU	✓		✓			✓					
6BYN8R	✓	✓	✓	✓	✓	✓	✓	✓	✓		Microchemical tests
6D7743	✓	✓	✓		✓	✓	✓		✓		
6DM83Y	✓		✓		✓	✓	✓				
6MCBTX	✓	✓	✓	✓	✓	✓			✓		
6QV6U6	✓	✓	✓	✓		✓	✓				
74XVC4	✓	✓	✓	✓	✓	✓	✓		✓		
7BXDNU	✓	✓	✓	✓		✓	✓				
7BXFEY	✓	✓	✓	✓		✓	✓		✓		
7FRC26	✓	✓	✓	✓	✓	✓			✓		Thin Layer Chromatography
7M6BM3	✓		✓	✓	✓	✓	✓				VSC 6000; Discriminate Analysis of FTIR Spectrum
7NMARD	✓		✓		✓	✓	✓				Raman spectroscopy
7PTX6H	✓	✓	✓	✓	✓	✓	✓				HPLC-DAD-MS
7U8B76	✓	✓	✓	✓	✓	✓		✓	✓	✓	Alternate Light Source
7V3VXB	✓	✓	✓	✓	✓	✓	✓				
8WRQTH	✓		✓		✓	✓			✓		
97WX7X	✓	✓	✓		✓	✓	✓		✓		
9QVLBX	✓	✓	✓		✓	✓	✓		✓		
9UJVMK	✓	✓	✓		✓	✓	✓				
A8Z8DK	✓	✓	✓	✓	✓	✓	✓				
AGQTJJ	✓				✓	✓		✓	✓		Digital Microscope
AQG64C	✓	✓	✓	✓	✓	✓			✓	✓	
ARA6WG	✓				✓	✓					Py-GC/MS
ATJCXN	✓	✓	✓	✓		✓	✓				

TABLE 3

WebCode	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	Other
B2VLAN	✓	✓	✓		✓	✓	✓		✓		possible silk heated to char and placed in concentrated HCL
BA779D	✓	✓	✓		✓	✓			✓		
BBUN3J	✓	✓	✓	✓		✓	✓				Comparison using Blue, UV & White light, UVMSP & MSP
BHFC73	✓	✓	✓	✓	✓	✓			✓		
BN9ECM	✓	✓	✓	✓	✓	✓	✓				cross section assessed from longitudinal view
BP4Z4T	✓	✓	✓		✓	✓	✓		✓		
BTHVJQ	✓	✓	✓	✓	✓	✓					
BURPFQ	✓		✓			✓					
C4RYYK	✓	✓	✓	✓		✓					Thin Layer Chromatography (TLC)
CBA8MG	✓	✓		✓		✓	✓				
CCMU6V	✓	✓	✓	✓	✓	✓					
CUQ6D9	✓				✓	✓	✓		✓		RAMAN and TLC
CXJD93	✓	✓	✓	✓	✓	✓	✓		✓		
D66JRV	✓	✓	✓		✓	✓	✓		✓		
DCGZYV	✓	✓	✓	✓	✓	✓	✓		✓		Thin-Layer Chromatography
DERR6Q	✓		✓		✓	✓	✓		✓		pyrolysis
DYDJ6M	✓		✓					✓			
E3YFJ6	✓		✓	✓		✓			✓		UV / VIS
E4M22U	✓	✓	✓	✓		✓	✓		✓		
F2BJHP	✓				✓	✓		✓			PyGC-MS, SEM-EDS
F4G7VT	✓	✓	✓	✓	✓	✓	✓	✓	✓		Berek Compensator
F9EJ2R	✓	✓	✓	✓	✓	✓	✓		✓		Thin Layer Chromatography
FBYP2E	✓		✓		✓	✓	✓		✓		
FEJEKR	✓		✓			✓	✓			✓	

TABLE 3

WebCode	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	Other
FFYQEP	✓					✓					
FKPB7C	✓	✓	✓		✓			✓		✓	
FN94HE	✓	✓	✓		✓	✓	✓		✓		
FZMZMJ	✓	✓	✓	✓	✓	✓	✓		✓		
FZZU2X	✓	✓	✓	✓		✓	✓		✓		
G28G8B	✓	✓	✓	✓	✓	✓	✓				Optical Cross Section
GAMA6R	✓	✓	✓		✓	✓					
GBGYP9	✓	✓	✓	✓	✓	✓	✓		✓		
GCTM3T	✓	✓	✓	✓	✓	✓	✓				
GTGTJZ	✓	✓	✓	✓	✓	✓					High Performance Thin Layer Chromatography
H34AMU	✓	✓	✓	✓	✓	✓	✓				
HDMJBN	✓	✓	✓		✓	✓		✓	✓	✓	
HDXRV9	✓	✓	✓		✓	✓					
HNXBG9	✓	✓	✓		✓	✓	✓		✓		
HQKYQN	✓	✓	✓	✓		✓	✓				
HTDNGW	✓	✓	✓	✓	✓	✓	✓				
HULVLA	✓	✓	✓			✓			✓		ALS-Fluorescence
HYZCEM	✓	✓	✓	✓	✓	✓	✓				
J9ZLXG	✓	✓	✓	✓	✓	✓	✓				
KM3E3Y	✓		✓	✓	✓	✓	✓				
KRTPEH	✓	✓	✓	✓	✓	✓	✓		✓		
M34XV8	✓	✓	✓		✓	✓					
MAGDB7	✓	✓	✓			✓					SEM
MCQWLC	✓	✓	✓	✓	✓	✓	✓		✓		
MXVFWE	✓	✓	✓		✓	✓	✓		✓		

TABLE 3

WebCode	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	Other
N7YWWJ	✓	✓	✓	✓		✓		✓			Raman
NDYDAA	✓	✓	✓	✓	✓				✓		
NECZRP	✓	✓	✓	✓	✓	✓	✓				
NPVLTD	✓	✓	✓		✓	✓					
NV29Q9	✓	✓	✓		✓	✓	✓				
P2HB2H	✓		✓			✓				✓	Pyr-GC-FID
P4RZQL	✓	✓	✓	✓	✓	✓	✓				
P7C8NM	✓	✓	✓		✓	✓	✓				
PAYKXQ	✓	✓	✓	✓	✓	✓	✓				
PTAG9A	✓		✓			✓					
PVVBV3	✓	✓	✓	✓		✓	✓	✓			
PZAQNF	✓	✓	✓	✓	✓	✓	✓		✓		
Q48R2H	✓	✓	✓	✓		✓	✓				TLC
QATPRQ	✓		✓			✓					
QBRTK2	✓	✓	✓	✓	✓	✓					
QCEGUF	✓	✓	✓	✓	✓	✓	✓		✓		
QG9DJ7			✓								
QPN8GN	✓	✓	✓	✓	✓	✓					
QQYYP6		✓	✓	✓	✓	✓	✓				UV MSP
QRBVTN	✓	✓	✓	✓	✓	✓	✓				
R77CHM	✓	✓	✓	✓		✓	✓	✓			Thin Layer Chromatography
R8YHLJ	✓	✓	✓	✓	✓	✓	✓				
REHTPM	✓	✓	✓	✓		✓	✓				
RHLGCP	✓		✓		✓						Dispersion stainning[sic] objective
RNA3KB	✓	✓	✓		✓	✓			✓		

TABLE 3

WebCode	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	Other
RP33DF	✓	✓	✓	✓	✓	✓	✓				
RPHCC9	✓	✓	✓	✓	✓	✓					
RZLETY	✓	✓	✓	✓	✓	✓		✓			
TGMG7X	✓	✓	✓	✓	✓	✓	✓	✓			Raman
TLGDT4	✓	✓	✓	✓	✓	✓	✓				
TMQKUB	✓		✓		✓	✓	✓	✓		✓	Pyrolysis
TQRL3K	✓	✓	✓	✓	✓	✓	✓				
TUQXZ7	✓	✓	✓		✓	✓		✓	✓		
TZYFYY	✓	✓	✓		✓	✓	✓		✓		Alternate Light Source
U928TK	✓	✓	✓	✓		✓	✓				
U9K9WY		✓	✓			✓		✓			
UQNG33	✓	✓	✓		✓	✓	✓				
UXNXD8	✓	✓	✓	✓	✓	✓	✓	✓	✓		
UZRD3Y	✓		✓			✓					x-ray microanalysis
W48RJ4	✓		✓			✓		✓			
W84BL3	✓	✓	✓	✓	✓	✓	✓	✓	✓		
W8BEJM	✓	✓	✓		✓	✓					
WDA83G	✓				✓	✓					HIROX
WLZT9F	✓	✓	✓	✓	✓	✓		✓	✓		
WYCUDL	✓	✓	✓	✓		✓	✓				Thin Layer Chromatography
XEHGXZ	✓		✓	✓	✓	✓					
XTLYTT	✓	✓	✓	✓	✓	✓	✓		✓		
Y33CY3	✓	✓	✓	✓	✓	✓	✓		✓		
Y6T4HZ	✓		✓		✓	✓	✓		✓		
ZDGJJA	✓	✓	✓			✓	✓				

TABLE 3

WebCode	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	Other
ZJP3KM	✓	✓	✓	✓	✓	✓					
ZM4FKB	✓	✓	✓	✓	✓	✓					
ZU7M4J	✓	✓	✓	✓	✓	✓	✓	✓	✓		
ZYLZ68	✓	✓	✓	✓	✓	✓	✓				

Response Summary

	Participants	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point
	151	147	117	142	85	112	144	91	21	60	8
Percent		*97%*	*77%*	*94%*	*56%*	*74%*	*95%*	*60%*	*14%*	*40%*	*5%*

Conclusions

TABLE 4

WebCode	Conclusions
22KRDV	The purple acrylic fibers found from suspect's coat (item 3) are consistent with the purple acrylic fibers of victim's scarf (item 2). Item 3 could be originated from item 2. Item 3 could not be originated from item 1 (The purple rayon and silk fibers of victim's hat). [sic]
27Y979	The fibers from Item 1 are different from the fibers in Item 2 or Item 3. The questioned fibers from Item 3 could not have originated from Item 1. The questioned fibers from Item 3 are the same as the fibers from Item 2 in color, diameter, cross section, optical properties, and the chemical composition of the synthetic fibers. The questioned fibers from Item 3 could have originated from Item 2.
286ZRU	The questioned fibers (Item 3) did not originate from the same source as the victim's hat (Item 1). The questioned fibers (Item 3) could have originated from the same source as the victim's scarf (Item 2).
2ETD2V	Fibers from the suspect's coat (Item 3) are similar in size, shape, color, fiber type, and microscopic characteristics to the known fibers from the victim's scarf (Item 2). It is my opinion that the fibers from the suspect's coat could have come from the victim's scarf, or another source with similar characteristics. The fibers from the suspect's coat (Item 3) are dissimilar in color and/or fiber type to the known fibers from the victim's hat (Item 1). It is my opinion that the fibers from the suspect's coat did not originate from the victim's hat.
2FLB6V	1. The sample received as the "Known section of yarn from the victim's hat" (item 1) is made by yarns made purple rayon fibers and other coated fibers not identificated. 2. The sample received as the "Known section of yarn from the victim's scarf" (item 2) is made by yarns made purple acrylic fibers. 3. The sample received as "Questioned fibers from the suspect's coat" (item 3) is composed by yarns made purple acrylic fibers. 4. According with the physical - chemical properties evaluated, the questioned yarns (fibers) received as item 3 are indistinguishable from the sample received as item 2. Nevertheless it must be considered any other fabric with the same mixture and physical - chemical properties of fibers as a possible source according with the physical - chemical properties evaluated. [sic]
2GXB2P	The purple fibers in Item 3 (Q1) and Item 2 (K2) were both identified as acrylic fibers and exhibited te same optical and chemical properties as well as visually appearing to have te same color. Item 3 (Q1) coud have originated from Item 2 (K2) or anoter similarly manufactured material. Item 1 (K1) was excluded as te source of Item 3 (Q1). [sic]
2JXJ7Z	Preliminary microscopic and FTIR-ATR of items 1 and 2 determined: The known item 1 sample consisted of a purple yarn piece. Purple rayon and silk-like fibers were detected in item 1. The known item 2 sample consisted of purple yarn piece. Purple acrylic fibers were detected in item 2. Preliminary microscopic analysis of item 3 determined: The unknown item 3 sample consisted of purple acrylic fibers. Item 3 is consistent in color and optical properties with the known item 2. Item 3 cannot be excluded from the known item 2. Item 3 is inconsistent in color and optical properties with the known item 1. Items 2 and 3 may be transferred to a full service laboratory for further instrumental comparison analysis and inclusion or exclusion.
2QL726	[No Conclusions Reported.]
2RV89X	Examination of the known fibers in Exhibit 2 showed them to consist of purple acrylic fibers. Examination of questioned fibers in Exhibit 3 showed them to consist of purple acrylic fibers. The fibers in Exhibit 3 were consistent in color, fiber type, chemical composition, and microscopical appearance with the known fibers in Exhibit 2. Therefore, the questioned fibers in Exhibit 3 could have originated from the same source as Exhibit 2 or from another source made of the same fiber type, color and chemical composition. Examination of the known fibers in Exhibit 1 showed them to be dissimilar to the questioned fibers recovered in Exhibit 3; therefore, Exhibit 1 was not the source of the fibers in Exhibit 3.

TABLE 4

WebCode	Conclusions
3369W3	The fibers isolated in Item 3 are the same composition, i.e., acrylic and the same diameter and color as these[sic] of the victim's scarf, Item 2, and possibly share a common origin. The fibers isolated on Item 3 did not originate from the victim's hat, Item 1.
33U37T	Purple fibers were recovered from the suspect's coat. A portion of these fibers was further analyzed and found to be similar in color, size, shape, optical properties, fiber type, and dye composition to the known fibers from the victim's scarf. It is my opinion these fibers could have originate[sic] from the victim's scarf or any other garment with similar fiber characteristics. (Category 2B). The purple fibers recovered from the suspect's coat are different in visual color, shape, optical properties, and fiber type to the known fibers from the victim's hat. It is my opinion these fibers did not originate from the victim's hat. (Category 5)
3GQDCC	Based on the techniques applied: - Item 1 (Victim's hat) was excluded as a possible source of the questioned purple acrylic fibres from the suspect's coat, based on differences in fibre type, colour, fluorescence and general microscopic features. - The fibres of Item 2 (Victim's scarf) could not be differentiated from the questioned fibres from the suspect's coat (Item 3). Therefore, I am of the opinion that the results of the fibre comparison performed strongly supports the proposition that the questioned fibres recovered from the suspect's coat (Item 3) came from the victim's scarf (Item 2) as oppossed[sic] to another random source. It should be noted that whilst the questioned fibres could have come from the victim's scarf, garments are commercially manufactured and the fibres could also have come from another identical scarf or different textile product composed of the same fibres.
3NRQBU	Item 1 - The fibers found in item 1 were not similar to the fibers in item 3. The hat is not the source of the fibers in item 3. Item 2 - The fibers found in item 2 were similar to the fibers in item 3. The scarf cannot be ruled out as a source of the fibers in item 3.
3P4EPZ	The suspect fibers from Item 3 were consistent with the known (victim's) fibers from Item 2.
3QF96Z	The fibers in item 3 were similar to the fibers in item 2, but the fibers in item 3 were different from the fibers in item 1. Item 2 and 3 consisted of manufactured acrylic fibers, but item 1 consisted of manufactured rayon and animal silk fibers.
3T82NX	Examination of Lab Item # 3 (Questioned fibers from the suspect's coat) revealed the presence of a clump of purple acrylic fibers. These fibers were found to be consistent with the purple acrylic fibers in Lab Item # 2 (Known section of yarn from the victim's scarf). Therefore, the purple acrylic fibers in Lab Item # 3 could have originated from the same source as the purple acrylic fibers in Lab Item # 2. Lab Item # 1 (Known section of yarn from the victim's hat) contained one purple yarn comprised of multiple purple fibers found to be not consistent with the fibers in Lab Item # 3. Therefore, the fibers in Lab Item # 3 could not have originated from the same source as the fibers in Lab Item # 1.
46CQVX	Item 3 is violet which shows characteristic polarized light image of acrylic. Item 1 is also violet in color but under the polarized light microscope, it is composed of two groups of fiber. None of the 2 groups' PLM image is identical with Item 1[sic]. Item 2 is violet and has characteristic polarized image of acrylic. According to infra-red spectroscopy, chemical composition of Item 1 is silk and rayon. Both Items 2 and 3 are acrylic. Visible absorption spectra of Item 2 and Item 3 coincide. Therefore Item 3 could have originated from Item 2.
47NDEX	No textile fibers like those comprising Item 1 were noted in Item 3. Accordingly, Item 1 is excluded as the source of the lavender colored acrylic textile fibers in Item 3. The lavender colored acrylic textile fibers in Item 3 demonstrate the same physical characteristics and chemical properties as those lavender colored acrylic textile fibers comprising Item 2. Accordingly, the source of Item 2 (or another source with the same physical characteristics and chemical properties) cannot be excluded as the source of the lavender colored acrylic textile fibers in Item 3.
48GD93	The acrylic fibers observed in Exhibit 3 are similar to the acrylic fibers observed in Exhibit 2; therefore,

TABLE 4

WebCode	Conclusions
	the fibers in Exhibit 3 could have originated from the same source as the fibers in Exhibit 2. The acrylic fibers in Exhibit 3 are dissimilar to the fibers observed in Exhibit 1.
49WQYK	The questioned fibers from the suspect's coat did not correspond with the item 1 fiber sample (yarn from the victim's hat) in microscopic characteristics to include color, birefringence, cross-sectional shape, sign of elongation or diameter. Therefore, the item 3 questioned fibers could not have originated from the item 1 known sample. The item 3 questioned fibers from the suspect's coat were consistent with item 2 in microscopic characteristics, FTIR (Acrylic), and Microspectrophotometry. Therefore, the known sample from the victim's scarf could have been the source of the item 3 questioned fibers.
4N8JFW	The sample, consisting of three items marked as Test No. 15-539, contain the following: Item 1 - Purple four-ply yarn from the victim's hat. Item 2 - Purple four-ply yarn from the victim's scarf. Item 3 - Purple fibers from the suspect's coat. The items were identified as: Item 1 - Rayon, a manufactured fiber. Item 2 - Acrylic, a manufactured fiber. Item 3 - Acrylic, a manufactured fiber. The questioned fibers (Item 3) could have originated from the victim's scarf (Item 2) since they are both of acrylic fiber.
4R8HY2	The fibers in Item 3 and Item 2 were found to be alike in all measured characteristics and it is possible they originated from the same source. The fibers in Item 3 were found to be dissimilar to the fibers in Item 1.
64XLWZ	The questioned fibers (Item 3) could have originated from the victim's scarf (Item 2), but not from the victim's hat (Item 1).
676XFM	The purple acrylic fibers in Q1 (Item 3) exhibit the same microscopic characteristics and optical properties as the purple acrylic fibers comprising K2 (Item 2). Accordingly, these fibers are consistent with originating from the K2 scarf, or another source comprised of fibers that exhibit the same microscopic characteristics and optical properties. The specimens were examined visually using stereomicroscopy, comparison microscopy, polarized light microscopy, fluorescence microscopy, microspectrophotometry, and Fourier transform infrared spectroscopy, where appropriate.
699WPU	Fibres from Item 3 are comparable to fibres from Item 2 regarding the morphology, chemical class characteristics and generic class and could have originated from the same source.
6BYN8R	Items 1, 2, and 3 were examined visually and using stereomicroscopy. Item 1, 2, and 3 fibers were examined using stereomicroscopy, polarized light microscopy (PLM), microsolubility tests, microchemical tests, and Fourier Transform Infrared Spectrophotometry (FTIR). Item 2 and 3 fibers were further examined using comparison microscopy, fluorescence microscopy, and Microspectrophotometry (MSP). Purple acrylic fibers in Item 3 were consistent in physical, chemical, and optical properties with the purple acrylic fibers composing the Item 2 yarn. It was concluded that these Item 3 acrylic fibers could have originated from the fiber source represented by Item 2 or another source composed of fibers with the same physical, chemical, and optical properties. Item 1 was composed of purple silk and rayon fibers. The Item 3 purple acrylic fibers could not be associated with the Item 1 fibers due to differences in color, shape, and fiber type.
6D7743	The known section of yarn from the victim's hat (Item 1) is composed of a mixture of purple rayon and purple silk fibers. The known section of yarn from the victim's scarf (Item 2) is composed of purple acrylic fibers. The purple questioned fibers from the suspect's coat (Item 3) were identified as acrylic fibers. The purple acrylic fibers from Item 3 are similar in color, chemistry, refractive index and cross sectional shape in comparison to the known section of yarn from the victim's scarf (Item 2). The purple fibers from Item 3 could have come from the victim's scarf, or any other similar purple acrylic fiber source. The purple questioned fibers from the suspect's coat (Item 3) are different in fiber composition and chemistry in comparison to the known section of yarn from the victim's hat (Item 1). The purple acrylic fibers from Item 3 could not have come from the victim's hat (Item 1).
6DM83Y	The fibers in item 3 were different from item 1 and similar to item 2. Item 1 consisted of manufactured

TABLE 4

WebCode	Conclusions
	rayon fibers mixed with animal silk. Item 2 and 3 consisted of manufactured acrylic fibers.
6MCBTX	A comparison of the fibers from the suspect's coat (exhibit 3) to the purple yarn samples collected from the victim's hat and scarf (exhibits 1 and 2, respectively) was performed using microscopic and instrumental methods. The fibers in exhibits 1 were identified as silk and rayon. The fibers in exhibits 2 and 3 were identified as acrylic. The fibers from the suspect's coat were similar to the yarn sample collected from the victim's scarf. Therefore, the exhibit 3 fibers could have originated from the victim's scarf (exhibit 2) or another source having similar fibers. The fibers from the suspect's coat were dissimilar to the yarn sample collected from the victim's hat (exhibit 1).
6QV6U6	The results of the examination support that the questioned fibers from the suspect's coat, Item 3, originate from the victim's scarf, Item 2. The questioned fibers from the suspect's coat, Item 3, do not originate from the victim's hat, Item 1.
74XVC4	I compared the questioned fibers, item 001-3, from the suspect's coat to the known sections of yarn from the victim's hat and scarf, items 001-1 and 001-2, respectively. I used stereomicroscopy, transmitted light comparison microscopy, polarized light microscopy, fluorescence microscopy, infrared microspectrophotometry, and visible microspectrophotometry in this examination. The questioned fibers, item 001-3, and the known section of yarn, item 001-2, are both composed of purple acrylic fibers. They are similar in physical characteristics such as color, size, and shape, as well as microscopical appearance. They have similar chemical composition as determined by infrared microspectrophotometry, and are similar in dye characteristics as determined by visible microspectrophotometry and fluorescence microscopy. The tuft of fibers, item 001-3, is a different type of fiber than the fibers that compose the known yarn, item 001-1. CONCLUSION The tuft of fibers, item 001-3, could have come from the same source as the known section of yarn, item 001-2, or another fabric composed of the same fibers exhibiting the same physical, microscopical, and chemical properties. The tuft of fibers, item 001-3, did not originate from the source of fibers as the known yarn, item 001-1.
7BXDNU	The Item 3 fibers collected from the suspect's coat were compared to the Item 1 fiber standard from the victim's hat and the Item 2 fiber standard from the victim's scarf. The Item 2 and 3 fibers are similar in color, microscopic characteristics and chemical composition; therefore, the Item 3 fibers could have originated from the victim's scarf. The Item 3 and Item 1 fibers are different fiber types; therefore, the item 3 fibers did not originate from the victim's hat.
7BXFEY	1. Examination of Exhibit 1 (known section of yarn from the victim's hat) disclosed the yarn to be composed of purple rayon and purple silk fibers. Examination of Exhibit 3 (questioned fibers from the suspect's coat) did not disclose the presence of fibers that are consistent with the fibers that compose Exhibit 1. 2. Examination of Exhibit 2 (known section of yarn from the victim's scarf) disclosed the yarn to be composed of purple acrylic fibers. Exhibit 3 consists of fibers that are consistent with the fibers that compose the yarn of Exhibit 2. Therefore, Exhibit 3 originated from the victim's scarf or another source with the same characteristics. 3. Techniques utilized in these examinations include stereomicroscopy, polarized light microscopy, fluorescence microscopy, microspectrophotometry, and Fourier transform infrared spectroscopy.
7FRC26	The questioned fibers (item #3) from the suspect's coat could have come from the victim's scarf (item #2). The questioned fibers (item #3) are dissimilar to the fibers from the victim's hat (item #1). Items #1, 2, and 3 were examined with the unaided eye, and with stereomicroscopes, a polarized light microscope, and an infrared spectrometer fitted with a microscope. The refractive indices of the fibers were estimated using refractive index liquids and a sodium D-line filter. The cross sectional shape of the fibers in Item 2 was determined by cutting the fibers. The color of the fibers in Items 2 & 3 was compared using a fluorescent light comparison microscope and thin layer chromatography. Item #1 & item #2 are purple/violet colored four ply yarns about one inch in length. Microscopic examination determined that there are two fiber types in the plies from Item 1. Item 2 plies have fibers with two different diameters in each of the four plies. Item #3 is violet colored questioned fibers, of two differing

TABLE 4

WebCode	Conclusions
	diameters, from the suspect's coat. Infrared spectroscopy determined fibers from the victim's hat are dissimilar to the questioned fibers from the suspect's coat. No further comparison of fibers in Item #1 to fibers in Item #3 was undertaken. It was determined that the questioned fibers (item #3) from the suspect's coat and known fibers (item #2) from the victim's scarf share physical, optical, and chemical characteristics. Fluorescence microscopy and analysis by thin layer chromatography show fibers from items #2 and #3 to be similarly colored. The fibers from the suspect's coat could have come from the victim's scarf or another source of fibers with characteristics similar to fibers in the victim's scarf. Examination of fibers by this method cannot associate recovered fibers to a specific textile.
7M6BM3	Item-1 is a blend of natural fibers (silk and/or wool) and rayon. Item-2 and Item-3 are composed of purple acrylic fibers. Item-1 does not share a common origin with Item-3. Analysis indicates that Item-2 and Item-3 shared all the class characters observed, therefore Item-3 cannot be excluded from sharing a common provenance with Item-2.
7NMARD	The fibers of Item-3 and Item-2, have the same caracteristics. Thus the fibres found on the suspect's coat (Item-3) come from the victim's scarf (Item 2) or from another textile item of indisguishable fibers. The fibers of Item-3 were inconsistent with Item-1 and could not have the same source. [sic]
7PTX6H	The hat (Item 1) is excluded as donor of the fibre traces (item 3). The results strongly support the hypothesis that the scarf (item 2) is the source of the fibre traces (item 3).
7U8B76	The fibers recovered from the suspect's coat (Item #3) are similar in the examined properties to the fibers comprising the victim's scarf (Item #2). Therefore, the fibers from the suspect's coat could have come from the victim's scarf or other source of similar fibers. The fibers comprising the victim's hat (Item #1) are dissimilar to the fibers recovered from the suspect's coat (Item #3); therefore, the victim's hat is not the source of the fibers recovered from the suspect's coat.
7V3VXB	The fibres recovered from the suspects clothing (Item 3) correspond in colour, composition and appearance to the fibres from the victim’s scarf (Item 2) and therefore could have originated from this item. The fibres recovered from the suspects clothing (Item 3) did not correspond in colour, composition and appearance to the fibres from the hat (Item 1) and therefore could not have originated from this item.
8WRQTH	The questioned fibers (Item 3) could not have originated from the victim's hat (Item 1), could have originated from the victim's scarf (Item 2).
97WX7X	The following items were submitted as fiber standard samples: Item 1 Known section of yarn from the victim's hat, Item 2 Known section of yarn from the victim's scarf. The yarn sample from Item 1 is composed of purple rayon and purple silk fibers. The yarn sample from Item 2 is composed of purple acrylic fibers. The following item was submitted for comparison to the fiber standards listed above: Item 3 Questioned fibers from the suspect's coat. The sample from Item 3 consists of purple acrylic fibers that are similar in color, chemical composition, and optical properties to the purple acrylic fibers composing the yarn of Item 2. It is possible that the fibers from Item 3 could have come from the same original source as the yarn sample from Item 2 or any other source manufactured in a similar process. This should be considered a Type 3 Association in the Association Scale presented at the end of this report. The purple acrylic fibers from Item 3 were not observed in the yarn sample from Item 1 and did not come from the same original source as the yarn sample from Item 1. This should be considered an Elimination on the Association Scale presented at the end of this report.
9QVLBX	The questioned fibers from the suspect's coat (item #3) and purple acrylic fibers that exhibit the same physical, microscopic, and chemical properties as the known section of yarn from the victim's scarf (item #2) and could have originated from this scarf or another of similar composition. It is pointed out that textile fibers do not possess enough individual characteristics to be positively identified as originating from a particular garment to the exclusion of all other garments. The known section of yarn from the victim's hat (item #1) is comprised of rayon and silk, and is eliminated as a source of the questioned

TABLE 4

WebCode	Conclusions
	fibers (item #3).
9UJVMK	The fibers were examined utilizing polarized light microscopy (PLM), infrared spectrophotometry (FTIR) and visible microspectrophotometry (MSP). Items #2 and #3 each consisted of purple acrylic fibers. The fibers from Item #2 and #3 were consistent in color, diameter, cross-sectional shape and chemical composition; therefore, Items #2 and #3 could have originated from the same source (Level III association). Item #1 consisted of a mixture of dark purple rayon fibers and light purple silk fibers. As the chemical composition of Items #1 and #3 are different; Item #3 could not have originated from the same source as Item #1 (Elimination). Terminology Key for Associative Evidence: The following descriptions are meant to provide context to the levels of opinions reached in this report. Every level of conclusion may not be applicable in every case nor for every material type. Level I Association: A physical match; items physically fit back to one another, indicating that the items were once from the same source. Level II Association: An association in which items are consistent in observed and measured physical properties and/or chemical composition and share atypical characteristic(s) that would not be expected to be readily available in the population of this evidence type. Level III Association: An association in which items are consistent in observed and measured physical properties and/or chemical composition and, therefore, could have originated from the same source. Because other items have been manufactured that would also be indistinguishable from the submitted evidence, an individual source cannot be determined. Level IV Association: An association in which items are consistent in observed and measured physical properties and/or chemical composition and, therefore, could have originated from the same source. As compared to a Level III association, items categorized within a Level IV share characteristics that are more common amongst these kinds of manufactured products. Alternatively, an association between items would be categorized as a Level IV if a limited analysis was performed due to characteristics or size of the specimen(s). Level V Association: An association in which items are consistent in some, but not all, physical properties and/or chemical composition. Some minor variation(s) exists between the known and questioned items and could be due to factors such as sample heterogeneity, contamination of the sample(s), or having a sample of insufficient size to adequately assess homogeneity of the entity from which it was derived. Inconclusive: No conclusion could be reached regarding an association/elimination between the items. Elimination: The items were dissimilar in physical properties and/or chemical composition, indicating that they did not originate from the same source.
A8Z8DK	The fibers making up the known section of yarn from the victim's scarf (Item 2) corresponded to the fibers in question from the suspect's coat (Item 3) with respect to microscopic characteristics (PLM), fiber type (Acrylic), fluorescence properties, chemical composition (FTIR), and visible spectra (MSP). Therefore, the fibers in question from the suspect's coat could have originated from the victim's scarf. It should be noted that an individual source cannot be determined since other textile items may have been manufactured that would be indistinguishable from the submitted evidence. The fibers making up the known section of yarn from the victim's hat (Item 1) were different with respect to microscopic characteristics (PLM), fiber type (Silk and Rayon blend) and chemical composition (FTIR) compared to the fibers in question from the suspect's coat (Item 3). Therefore, the victim's hat (Item 1) can be eliminated as a source of the Item 3 fibers.
AGQTJJ	The sample consists of three items: Item 1: Known section of yarn from the victim's hat, is composed of rayon. Item 2: Known section of yarn from the victim's scarf, is composed of acrylic. Item 3: Questioned fibers from the suspect's coat, is composed of acrylic. The fibers from item 3, found on the suspect's coat, could have been originated from the fibers of the victim's scarf. Both fibers (Item 2 and 3) have similar composition, coloration, diameter, longitudinal section and cross section appearance.
AQG64C	Microscopically light purple acrylic fibres sampled from Item 3 (from Suspect's coat) were found to be: a. Different from the fibres constituting Item 1 (from victim's hat). b. Similar to the microscopically light purple acrylic fibres constituting Item 2 (from victim's scarf). This suggests that Item 3 could have originated from the scarf marked Item 2, or from other sources containing fibres with similar characteristics.

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WebCode	Conclusions
ARA6WG	1. By FTIR and Py-GC/MS analysis, Item3 and Item1 are not similar in composition. 2. By FTIR and Py-GC/MS analysis, Item3 and Item2 are similar in composition.
ATJCXN	In my opinion the fibres recovered from the suspect's coat, item 3, could not have originated from the victim's hat, Item 1. The fibres recovered from the suspects coat, item 3, are indistinguishable from the fibres from the victim's scarf, item 2. In my opinion the presence of numerous acrylic fibres on the coat of the suspect which match the constituent fibres of the victim's scarf is of considerable significance. Although the constituent fibres shed by the scarf cannot be considered unique, they can be differentiated by their colour, microscopic appearance and chemical composition from the constituent fibres of very many other fabrics. As such, I consider the likelihood of observing such matching fibres by chance if they did not originate from the scarf from the victimd[sic] to be very low. In my opinion, therefore, the findings provide strong support for the view that there was contact between the suspect and the victim.
B2VLAN	Item 1 (Known from victim's hat) consists of a blend of red purple rayon with fewer light purple apparent silk fibers. Item 2 (Known from victim's scarf) consists of purple acrylic fibers. Item 3 (Questioned from suspect's coat) consists of purple acrylic fibers. Conclusions: The fibers from Item 1 (K-hat) and the fibers from Item 3 (Q-coat) were found to be dissimilar in microscopic characteristics (PLM), color (MSP), and chemical composition (FTIR). The fibers from Item 2 (K-scarf) and the fibers from Item 3 (Q-coat) were found to be similar in microscopic characteristics (PLM), color (MSP), and chemical composition (FTIR).
BA779D	Purple acrylic fibers were identified in Item 3 which are consistent with the known purple acrylic fibers from the scarf in Item 2 based on microscopic appearance and fiber type. Therefore, the questioned fibers in Item 3 could have originated from the scarf in Item 2. The Silk/Rayon fibers identified in Item 1 could not have been the source of the Acrylic fibers contained in Item 3.
BBUN3J	Fibres which were indistinguishable from the purple acrylic fibres making up the complainant's scarf were recovered from the suspect's winter coat. These fibers could have originated from her scarf. The presence of these distinctive matching fibers on the suspect's winter coat provides moderately strong support for the assertion that they originated from the complainants scarf.
BHFC73	The questioned fibers from the suspect’s coat (Item 3) were microscopically examined and compared to the fibers comprising the known samples, Items 1 and 2 (known yarns from the victim’s hat and scarf). These examinations revealed that the questioned acrylic fibers were consistent in appearance, fiber type and microscopic characteristics to the Item 2 fibers comprising the yarn from the victim’s scarf, and, therefore, could have originated from that source. Examinations also revealed that the questioned acrylic fibers were dissimilar to the fibers comprising the Item 1 yarn from the victim’s hat, and, therefore, did not originate from that source. Because textile materials are mass produced, it is not possible to state that a fiber originated from a particular source to the exclusion of all other textile materials composed of fibers which exhibit the same physical, optical, and/or chemical properties.
BN9ECM	The thread from the hat was composed of a mixture of purple rayon fibres and purple silk fibres. The thread from the scarf was composed of purple acrylic fibres. A small bundle of purple acrylic fibres were recovered from the suspect's coat, and these matched the fibres from the scarf. The results offer strong support for the view that the fibres on the suspect's coat came from the victim's scarf, rather than for the alternative view that they originated from another source. I have chosen the above phrase from the following: weak support, moderate support, moderately strong support, strong support, very strong support, extremely strong support
BP4Z4T	Representative samples of the above exhibits were taken for analytical and comparison purposes. They were examined visually, stereoscopically, by bright field and polarized light microscopy, and by Fourier Transform Infrared Spectroscopy (FTIR). In addition Exhibits 2 and 3 were examined by microspectrophotometry (MSP). Exhibit 1 consists of silk and rayon fibers. Both Exhibits 2 and 3 consist of acrylic fibers. The sample from Exhibit 3 is dissimilar to the sample from Exhibit 1 based on fiber type and color. Therefore, the fibers from the suspect’s coat could not have originated from the victim’s hat as manufactured. The sample from Exhibit 3 was found to be similar in all examined respects to the

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WebCode	Conclusions
	sample from Exhibit 2. Therefore, the fibers from the suspect's coat could have originated from the victim's scarf or another garment of similar composition.
BTHVJQ	The evidence was received on January 27, 2015. Fibers composing the above Items were examined using stereomicroscopy, comparison microscopy, fluorescence microscopy, polarized light microscopy (PLM), and Fourier Transform Infrared Spectrophotometry (FTIR). Item 1 was composed of two different types of purple fiber identified as regenerated cellulose and wool. Item 2 was composed of one type of purple fiber identified as acrylic. Item 3 was composed of one type of purple fiber identified as acrylic. The purple acrylic fibers in Item 3 were consistent in physical, chemical and optical properties as the fibers in Item 2. It was concluded that the Item 3 purple acrylic fibers could have originated from Item 2 or another source of fibers with the same physical, chemical and optical properties. Based upon the fibers analyzed, item 3 could not be associated with Item 1 due to differences in optical properties and fiber type.
BURPFQ	The purple fibers from the suspect's coat (item 3) are similar in color and composition to the fibers from the victim's scarf (item 2). However, the fibers from the victim's hat (item 1) do not match the fibers from the suspect's coat. It is possible that the fibers from the suspect's coat originated from the victim's scarf.
C4RYYK	The tuft of acrylic fibres (item 3) recovered from the suspect's coat were found to be indistinguishable from the acrylic fibres comprising the victim's scarf (item 2), in terms of microscopic appearance, fluorescence, instrumental colour analysis, chemical composition and dye component analysis. Therefore, in my opinion, item 3 could have originated from item 2 and could not have originated from item 1. In the absence of a defence alternative I have not evaluated the findings further.
CBA8MG	The questioned fibers from the suspect's coat (Item 3) and the known section of yarn from the victim's scarf (Item 2) had similarities in their microscopic characteristics, fiber type (acrylic), infrared spectra (FTIR) and color (MSP). In my opinion, the questioned fibers (item 3) could have originated from the victim's scarf (item 2).
CCMU6V	The two types of purple acrylic fibers recovered from the coat (Item 3) were determined to be physically, microscopically and chemically (Comparison Microscopy and Fourier Transform Infrared Spectroscopy) consistent with the two types of purple acrylic fibers from the scarf (Item 2) and therefore may have once had a common origin. The purple fibers from the hat (Item 1) are physically, microscopically and chemically dissimilar to the purple fibers recovered from the coat (Item 3) and therefore could not have had a common origin.
CUQ6D9	Yarn from the victim's scarf (item 2) is S-twist type and made up of 4 single yarns which are identical in composition and structure. Our procedure reveals that fibres of item 2 and fibres of item 3 (questioned fibres from the suspect's coat) are not differentiated. Therefore the fibres found of the suspect's coat (item 3) could have come from the victim'[sic] scarf (item 2). These fibres are acrylic fibres (type Polyacrylonitrile/vinylacetate). Yarn from the victim's hat (item 1) is S-twist type and made up of 4 single yarns which are identical in composition and structure. Each yarn is a blend of viscose (major fibres) and others fibres among which we identified cotton. All these fibres are different from fibres of items 2 and 3, in colour and shape.
CXJD93	Purple acrylic fibers found in specimen Item 3 exhibit the same microscopic characteristics and optical properties as the purple acrylic fibers comprising Item 2. Accordingly, these fibers are consistent with originating from the source of Item 2, or another item comprised of fibers that exhibit the same microscopic characteristics and optical properties. The fibers in Item 3 are microscopically dissimilar to the fibers comprising Item 1. Accordingly, these fibers are not consistent with originating from the source of Item 1. The specimens were examined using the following methods as appropriate: stereomicroscopy, comparison microscopy, polarized light microscopy, fluorescence microscopy, microspectrophotometry, and Fourier transform-infrared spectroscopy.
D66JRV	The examined portions of questioned fibers from the suspect's coat (Item 1-3) were found to be

TABLE 4

WebCode	Conclusions
	consistent in fiber type, color, microscopic appearance and instrumental properties with the examined portions of the known section of yarn from the victim's scarf (Item 1-2). Accordingly, the questioned fibers from the suspect's coat could have originated from the victim's scarf. The examined portions of questioned fibers from the suspect's coat (Item 1-3) were found to be different in fiber type with the examined portions of the known section of yarn from the victim's hat (Item 1-1). Accordingly, the questioned fibers from the suspect's coat could not have originated from the victim's hat.
DCGZYV	The purple acrylic fibers in Item 3 were identical to the purple acrylic fibers in Item 2 in color and microscopic characteristics. This means the fibers found on the suspect's coat could have come from the victim's scarf. Item 3 was different from Item 1. This means the fibers found on the suspect's coat did not come from the victim's hat.
DERR6Q	All item consisted of fibers, namely a purple fibers. According to the FT-IR analysis item 1 is different from item 2 and 3. [sic]
DYDJ6M	This sample consists of three item numbers. Item #1 is a small piece of purple colored yarn that is composed of Rayon with trace amounts of polyester fibers. Item #2 is a small piece of purple colored yarn that is composed of acrylic fibers. Item #3 are purple fibers that are acrylic.
E3YFJ6	USING OF METHODS DESCRIBED THE FIBRES ADHERING TO THE SUSPECT'S COAT COULD NOT BE DIFFERENTIATED FROM THE FIBRES OF THE VICTIM'S SCARF. BASED ON THE FINDINGS OF THE FIBRES EXAMINATION IT IS PROBABLE THAT THE FIBRES ADHERING THE SUSPECT'S COAT ORIGINATED FROM A TEXTILE ALIKE[sic] THE VICTIM'S SCARF.
E4M22U	The purple acrylic fibers, (item 3), display differences in color, physical characteristics and chemical composition as compared to the purple rayon and the purple silk reference fibers collected from the victim's hat, (item 1). Elimination. The purple acrylic fibers, (item 3), are consistent in color, physical characteristics and chemical composition as compared to the purple acrylic reference fibers collected from the victim's scarf, (item 2). Level III association.
F2BJHP	According to above mentioned analyses, item2 was found to have similar physical and chemical structure with item3, but item1 has different physical and chemical structure from item3. Therefore, item3 may have originated from item2.
F4G7VT	The questioned purple acrylic fibers observed in item 3 are microscopically similar to the question purple acrylic fibers which comprise Item 2. Therefore, the questioned fibers recovered from item 3 could have originated from item 2 and can not be associated with Item 1.
F9EJ2R	Purple acrylic fibers found in Item 3 were identical to purple acrylic fibers in Item 2 in color, general fiber type, and microscopic characteristics.* Purple acrylic fibers found in Item 3 were different than the fibers in Item 1.** *This means that the questioned fibers from the suspect's coat could have come from the victim's scarf. **This means that the questioned fibers from the suspect's coat did not come from the victim's hat.
FBYP2E	1. Fiber standard comprised of purple silk and purple rayon fibers. 2. Fiber standard comprised of purple acrylic fibers. 3. In the sample analyzed, several purple acrylic fibers were found. The unknown fibers from the suspect's coat either originated from the fiber standard from the victim's scarf (item #2) or another source of fibers possessing the same distinct physical, chemical, and optical characteristics. The unknown fibers from the suspect's coat and the fiber standard from the victim's hat (item #1) are not the same in physical, chemical and optical characteristics. The unknown fibers could not have originated from the fiber standard from the victim's hat (item #1).
FEJEKR	The fibers from Item 3 (fibers from suspect's coat) were identified as acrylic fibers and are similar in physical properties and chemistry to the acrylic fibers from Item 2 (yarn from the victim's scarf). The fibers from Item 3 could have originated from Item 2 or from another source constructed with similar

TABLE 4

WebCode	Conclusions
	fibers. The fibers of Item 1 (yarn from victim's hat) were identified as a blend of rayon and silk fibers. The rayon and silk fibers from Item 1 are different in physical properties and chemistry from the acrylic fibers from Item 3 (fibers from the suspect's coat). The fibers recovered from Item 3 could not have originated from Item 1. Chemical analysis performed includes: Polarized Light Microscopy (PLM), Fourier Transform Infrared Spectroscopy (FTIR), and Microspectrophotometry (MSP).
FFYQEP	The fibers were identified on the basis of IR spectra and stereomicroscopic examination. The known yarn from the victim's hat (Item 1) is made of rayon and animal fibers while the known yarn from the victim's scarf (Item 2) is made of acrylic fibers. The questioned fibers (Item 3) proved to be acrylic fibers. The questioned fibers (Item 3) could have originated from the victim's scarf (Item 2).
FKPB7C	Question # 4: Wordings of the conclusions in the report. The fibers recovered from the suspect's coat (Item # 3) could have originated from the source of the fibers (yarn) contained in the victim's scarf (Item # 2). The fibers (yarn) from the victim's hat (Item # 1) were dissimilar to the fibers in Items # 2 and #3 and therefore could not be associated with the fibers in the yarn from the victim's scarf (Item #2) or the questioned fibers from the suspect's coat (Item #3).
FN94HE	The victim's hat (Item 1) consists of purple rayon and purple silk fibers. The victim's scarf (Item 2) consists of purple acrylic fibers. These items were used for comparison purposes. Several fibers were recovered from the suspect's coat (Item 3). A portion of these fibers are purple acrylic fibers that are similar in size, shape, color, and fiber type to the victim's scarf (Item 2). It is my opinion that these fibers could have come from the victim's scarf, or any other item of similar construction. These fibers are also dissimilar in visual color and fiber type to the victim's hat (Item 1). It is my opinion that these fibers did not originate from the victim's hat. The remaining fibers were not analyzed.
FZMZMJ	ITEMS EXAMINED: Lab Item#-1.1 Agency Item#-1 Description-Known Fibers from the victim's hat (Item 1). Lab Item#-1.2 Agency Item#-1 Description-Known Fibers from the victim's scarf (Item 2). Lab Item#-1.3 Agency Item#-1 Description- Questioned Fibers from the suspect (Item 3). RESULTS OF EXAMINATION: A population of violet fibers exceeding six (6) in number was observed in a wax envelope containing questioned fibers (Item 1.3). Six (6) known fibers from the yarn from the victim's scarf (Item 1.2) were consistent with six (6) of the questioned fibers recovered from the suspect (Item 1.3) based on microscopic observations and spectrophotometric analysis in the visible light region. Of these, two (2) known violet synthetic acrylic fibers from the victim's scarf (Item 1.2) were consistent with two (2) violet synthetic acrylic fibers recovered from the suspect (Item 1.3) based on microscopic observations and spectrophotometric analysis in the visible light region and infrared region. Six (6) known magenta fibers from the yarn length (Item 1.1) were microscopically inconsistent with six (6) violet fibers removed from the questioned fibers from the suspect (Item 1.3). A population of magenta colored fibers exceeding six (6) in number was observed in a wax envelope containing known fibers from the victim's hat (Item 1.1). Two (2) of these fibers (Item 1.1) were confirmed to be synthetic rayon fibers. The results in this report are specific to the trace evidence category of fibers. Other trace substances may be present. Additional examinations can be performed if requested. INTERPRETATION STANDARDS: Consistent – possessing agreeing or accordant features; compatible; free from significant variation, based on experience and training, relevant to the analytical techniques utilized; not able to perceive a difference in, relevant to the analytical techniques utilized. Inconsistent – exhibiting significant variation, based on experience and training, relevant to the analytical techniques utilized. Physically – related to physical properties. Optical – of, relating to, or utilizing light especially instead of other forms of energy. Spectrophotometrically– resulting from the quantitative study of electromagnetic spectra. Microscopic – indistinguishable without the use of a microscope. QUALIFYING STATEMENTS: Physical, optical and spectrophotometric comparisons of known and questioned fiber samples do not allow for unique associations to the exclusion of all other possible fiber sources. ADDITIONAL INFORMATION: This report contains the conclusions, opinions, and interpretations of the analyst whose signature appears on this report.
FZZU2X	1. Examination of Exhibits 1 (known section of yam[sic] from the victim's hat) and 2 (known section of yarn from the victim's scarf) disclosed the following: a. Exhibit 1 consists of a single yarn that is

TABLE 4

WebCode	Conclusions
	composed of silk and rayon fibers. Techniques utilized in this examination include stereomicroscopy, polarized light microscopy, and Fourier transform infrared spectroscopy. b. Exhibit 2 consists of a single yarn that is composed entirely of acrylic fibers. Techniques utilized in this examination include stereomicroscopy, polarized light microscopy, and Fourier transform infrared spectroscopy. 2. Examination of Exhibit 3 (questioned fibers from the suspect's coat) disclosed the presence of a bundle of acrylic fibers. The following conclusions were drawn: a. The acrylic fibers in Exhibit 3 are consistent with the acrylic fibers that compose Exhibit 2. Therefore, these fibers originated from Exhibit 2 or another source with the same characteristics. Techniques utilized in this examination include stereomicroscopy, polarized light microscopy, comparison microscopy, microspectrophotometry, and Fourier transform infrared spectroscopy. b. The acrylic fibers in Exhibit 3 are not consistent with the silk and rayon fibers that compose Exhibit 1 and therefore could not have originated from Exhibit 1. Techniques utilized in this examination include stereomicroscopy, polarized light microscopy, comparison microscopy, and Fourier transform infrared spectroscopy.
G28G8B	The purple acrylic fibers found in specimen Q1 (Item #3) exhibit the same microscopic characteristics and optical properties as the purple acrylic fibers comprising specimen K2 (Item #2). Accordingly, these fibers are conistent[sic] with having originated from specimen K2 (Item #2), or another source comprised of fibers that exhibit the same microscopic characteristics and optical properties. The specimens were examined visually using stereo-microscopy, comparison microscopy, polarized light microscopy, fluorescence microscopy, microspectrophotometry, and infrared spectroscopy where appropriate.
GAMA6R	Item 1 is eliminated as the source because the fibers are macroscopically and microscopically dissimilar to the fibers from item 3. The fibers from items 2 and 3 are macroscopically and microscopically similar to one another, and chemically indistinguishable. Item 2 could be the source of item 3.
GBGYP9	The known fibers from the hat (Item 1), the known fibers from the scarf (Item 2), and the questioned fibers from the coat (Item 3) were examined and compared using microscopy, fluorescence, infrared spectroscopy, and microspectrophotometry. Item 1 consisted of a mixture of magenta rayon fibers and light and dark purple silk fibers. Item 2 and Item 3 each consisted of purple acrylic fibers. The questioned fibers of Item 3 differed from all examined known fibers of Item 1 in all examinations performed. The questioned fibers did not originate from the hat. The questioned fibers of Item 3 were similar to the examined known fibers of Item 2 in all examinations performed. The scarf is a possible source of the questioned fibers. Because similar fibers have been manufactured that would be indistinguishable from the submitted evidence, an individual source cannot be determined.
GCTM3T	Microscopic examination of Lab Item # 1 disclosed a yarn composed of purple fibers. Microscopic examination revealed that the yarn was composed of the following fibers: K1a - Purple, crenulated-oval shaped rayon fibers, K1b - Purple to colorless, triangular shaped, silk fibers. Two K1a fibers, designated K1a.1 and K1a.2, were analyzed instrumentally (FTIR) and found to be rayon. Six K1b fibers, designated K1b.1 - K1b.6, were analyzed instrumentally (FTIR) and found to be silk. Microscopic examination of Lab Item # 2 disclosed a yarn composed of purple fibers. Microscopic examination revealed that the yarn was composed of the following fibers: K2 - Bright, pink-purple, round acrylic fibers. A K2 fiber, designated K2.1, was analyzed instrumentally (FTIR) and found to be acrylic. Microscopic examination of Lab Item # 3 disclosed purple fibers. Microscopic examination revealed the following fibers: Q1 - Bright, pink-purple, round acrylic fibers. A Q1 fiber, designated Q1.1, was analyzed instrumentally (FTIR) and found to be acrylic. Microscopic comparison of the questioned fibers, Q1, with the known fibers, K1a and K1b, disclosed that they are different with respect to their physical and optical properties. It is the opinion of the undersigned that the questioned fibers could not have come from the source (Lab Item # 1) represented by the known fibers, K1a and K1b. Microscopic and instrumental (UV-Vis MSP) comparison of the questioned fibers, Q1, and known fibers K2 disclosed that they are consistent and no discriminating differences were observed with respect to their physical and optical properties. Instrumental (FTIR) comparison of one Q1 fiber (designated Q1.1) with one known K2 fiber (designated K2.1) disclosed that they are also consistent and no discriminating differences were observed with respect to their chemical properties. It is the opinion of the undersigned that the

TABLE 4

WebCode	Conclusions
	questioned fiber, Q1.1, could have come from the same source (Lab Item # 2) as represented by the known submitted exemplar, K2.1, or from another source exhibiting all of the same analyzed characteristics. No conclusions are reached about the remaining Q1 and K2 fibers. Because textile fibers are mass produced, it is not possible to state that a fiber originated from a particular textile source to the exclusion of all other materials composed of fibers which exhibit the same chemical, physical, and optical properties.
GTGTJZ	I was unable to distinguish between the fibres comprising each of items 2 (known section of yarn from the complainant's scarf) and 3 (questioned fibres from the suspect's coat) on the basis of their colour (light purple), fibre composition (acrylic), fibre diameters, fibre morphologies, optical properties, fluorescence and dye components. I am therefore of the opinion that, based on the testing conducted, the known section of yarn from the complainant's scarf (item 2), or a similar yarn produced by the same manufacturer, could be the source of the questioned fibres from the suspect's coat (item 3). I was able to exclude item 1 (known section of yarn from the complainant's hat) as being a source of the fibres from item 3 (questioned fibres from the suspect's coat) on the basis of their fibre types (item 1 being comprised of a blend of rayon and silk fibres and item 3 being comprised of acrylic fibres). I am therefore of the opinion that, based on the testing conducted, the known section of yarn from the complainant's hat (item 1) could not be the source of the questioned fibres from the suspect's coat (item 3).
H34AMU	CONCLUSIONS: Questioned fibers identified as removed from the suspect’s coat (Item 3) originated from the victim’s scarf (Item 2) or another source of textile material possessing fibers with the same distinct microscopic, optical, and chemical characteristics. RESULTS: Questioned fibers identified as removed from the suspect’s coat (Item 3) were examined to determine whether or not they are consistent with the known fibers from the victim’s hat (Item 1) and/or the known fibers from the victim’s scarf (Item 2). The known section of yarn identified as from the victim’s hat (Item 1) is composed of rayon and silk fibers. The known section of yarn identified as from the victim’s scarf (Item 2) is composed of acrylic fibers. Examination and comparison of questioned fibers removed from the suspect’s coat (Item 3) reveals they are consistent in microscopic, optical, and chemical characteristics with the known fibers of the victim’s scarf (Item 2). It is therefore concluded the questioned fibers originated from the scarf or another source of textile material possessing fibers with the same distinct microscopic, optical, and chemical characteristics. Examination and comparison of questioned fibers removed from the suspect’s coat (Item 3) reveals they are inconsistent in microscopic characteristics with the known fibers of the victim’s hat (Item 1). It is therefore concluded the questioned fibers did not originate from this portion of the hat. METHODS OF ANALYSIS: Examinations were performed visually, by stereo microscopy, brightfield/polarized light comparison microscopy, fluorescence microscopy, microspectrophotometry, and Fourier transform infrared microspectroscopy.
HDMJBN	The questioned fibers from the suspect's coat, Item 3 exhibited microscopic and physical characteristics different from the victim's hat, Item 1, and therefore could not have come from the hat. The questioned fibers from the suspect's coat, Item 3, exhibited the same microscopic and physical characteristics as the fibers from the victim's scarf, Item 2, and therefore could have come from the scarf.
HDXRV9	The constituent fibres from a sample of purple yarn from the victim’s hat (item 1) were identified as Rayon and Silk and the constituent fibres from a sample of purple yarn from the victim’s scarf (item 2) were identified as Acrylic. The purple questioned fibres from the suspect’s coat (item 3) were identified as Acrylic and were indistinguishable from the constituent fibres of the victim’s scarf (item 2) in microscopic appearance and chemical composition. The questioned fibres recovered from the suspect’s coat (item 3) could have come from the victim’s scarf (item 2) or another textile item containing indistinguishable fibres. They could not have come from the victim’s hat (item 1).
HNXBG9	Item 3 could have originated from item 2 as represented by the known submitted exemplar or from another source exhibiting all of the same analyzed/measured characteristics. Item 3 could not have come from the source represented by item 1.

TABLE 4

WebCode	Conclusions
HQKYQN	Methods: Microscopic examination of fibers is accomplished by using one or more analytical techniques including stereomicroscopy, comparison microscopy, polarized light microscopy, fluorescence microscopy, and instrumentally using microspectrophotometry and Fourier transform-infrared spectroscopy. Results of Examinations: Purple acrylic fibers found in Item 3 exhibit the same microscopic characteristics and optical properties as the purple acrylic fibers comprising Item 2; accordingly, these fibers are consistent with originating from the source of Item 2 or from another textile comprised of fibers which exhibit the same microscopic characteristics and optical properties. The fibers in Item 3 are microscopically dissimilar to the fibers comprising Item 1; accordingly, these fibers are not consistent with originating from the source of Item 1. The submitted specimens were examined using stereomicroscopy, comparison microscopy, polarized light microscopy, fluorescence microscopy, microspectrophotometry, and Fourier transform infrared spectroscopy, where appropriate.
HTDNGW	1. Examinations of Items 1 (known section of yarn from the victim's hat), 2 (known section of yarn from the victim's scarf), and 3 (questioned fibers from the suspect's coat) disclosed the following: a. Item 1 was composed of a mixture of rayon fibers and silk fibers. b. Item 2 was composed of acrylic fibers. c. Item 3 was composed of acrylic fibers. 2. Comparative examinations of the questioned fibers in Item 3 with the known fibers in Item 1 disclosed them to be dissimilar in their microscopic characteristics and fiber types. Therefore, the fibers in Item 3 could not have originated from the known yarn sample as represented by Item 1. 3. Comparative examinations of the questioned fibers in Item 3 with the known fibers in Item 2 disclosed them to be consistent in their microscopic and color characteristics. Further examinations of these fibers in Items 2 and 3 disclosed them to be consistent in their organic composition. Therefore, the fibers in Item 3 could have originated from the known yarn sample as represented by Item 2.
HULVLA	Item #3 could not have come from the known source represented by Item #1. Item #3, however, could have originated from item #2 or another source exhibiting all of the same analyzed characteristics.
HYZCEM	1. Examination of Item 3 (questioned fibers from suspect's coat) is a tuft of numerous textile fibers with a similar appearance. A representative number of these fibers were selected for comparison and were determined to be acrylic in composition. 2. Examination of Item 1 (known yarn from victim's hat) disclosed it to be composed of rayon and silk fibers. Examination of Item 3 (questioned fibers from suspect's coat) did not disclose the presence of fibers that are consistent with the fibers that compose Item 1. 3. Examination of Item 2 (known yarn from victim's scarf) disclosed it to be composed of acrylic fibers. Examinations of the representative fibers from Item 3 (questioned fibers from suspect's coat) are consistent with the fibers that compose Item 2. Therefore, these fibers originated from Item 2 or another source with the same characteristics. 4. Techniques utilized in these examinations include stereo microscopy, polarized light microscopy, comparative microscopy, microspectrophotometry, and micro Fourier transform infrared spectroscopy.
J9ZLXG	The questioned fibers in Item 3 (from the suspect's coat) corresponded in microscopic characteristics (PLM), color, type (acrylic), fluorescence, chemical composition (FTIR) and visible spectra (MSP) to the known fibers in Item 2 (from the victim's scarf). Therefore, Items 2 and 3 could have a common source (Type 3 Association). It should be noted that since similar items may have been manufactured which would be indistinguishable from the submitted evidence, an individual source cannot be determined. The questioned fibers in Item 3 were a different type (acrylic) than the known fibers (rayon and silk) from the victim's hat and therefore Item 1 can be eliminated as being the source of the Item 3 fibers (Elimination).
KM3E3Y	The known section of yarn from the victim's hat in Item 1 comprised purple silk and purple rayon fibres. The known section of yarn from the victim's scarf in Item 2 comprised purple acrylic fibres. The questioned fibres from the suspect's coat in Item 3 comprised purple acrylic fibres, agreeing in colour, fibre type and microscopic appearance under various conditions with the control purple acrylic fibres from the known section of yarn in Item 2, indicating that the questioned fibres in Item 3 could have originated from the victim's scarf from which the known section of yarn was taken in Item 2.

TABLE 4

WebCode	Conclusions
KRTPEH	The questioned purple acrylic fibers in Item 3 were visually, microscopically and instrumentally different from the rayon and silk fibers from the victim's hat in Item 1. This indicates that the questioned purple fibers in Item 3 did not originate from the victim's hat (Item 1). The questioned purple acrylic fibers in Item 3 were visually, microscopically and instrumentally consistent with the purple acrylic fibers from the victim's scarf in Item 2. This indicates that the questioned purple fibers in Item 3 could have originated from the victim's scarf (Item 2).
M34XV8	Physical, microscopic, and instrumental comparison of the questioned fibers from Item 3 with the known fibers from Item 2 revealed them to be consistent with respect to color, optical properties, and fiber type. Therefore, the fibers from the suspect's coat could have originated from the victim's scarf or another fabric with these same properties. Physical, microscopic, and instrumental comparison of the questioned fibers from Item 3 with the known fibers from Item 1 revealed them to be inconsistent with resepct[sic] to color and optical properties. Therefore, the fibers from the suspect's coat could not have originated from the victim's hat.
MAGDB7	The questioned fiber (Item 3), could have originated from Item 2 (the victims scarf) but not from Item 1 (the victims hat).
MCQWLC	The acrylic fibers identified in Exhibit 3 have the same physical characteristics and chemical composition as the acrylic fibers comprising the piece of yarn in Exhibit 2. The fibers in Exhibit 3 could have originated from Exhibit 2 or from any other material consisting of acrylic fibers with the same physical characteristics and chemical composition. The fibers comprising the yarn in Exhibit 1 were identified as rayon and silk. The fibers in Exhibit 3 could not have originated from Exhibit 1.
MXVFWE	Item 1 was found to consist of purple blue silk fibers and purple red rayon fibers. Item 2 was found to consist of purple acrylic fibers. Item 3 was found to consist of purple acrylic fibers. The fibers from Item 1 were found to be dissimilar to the fibers in Item 3 in microscopic characteristics, color and chemical composition. The fibers from Item 2 were found to be similar to the fibers in Item 3 in microscopic characteristics, color and chemical composition.
N7YWWJ	Item 3 cannot originated from the victim's hat represented by Item 1. Item 3 can originated from the victim's scarf represented by Item 2. [sic]
NDYDAA	Item 1 consists in a thread. The thread is made of violet manufactured and vegetable fibers. The examined manufactured sample fibres (20) are probably Acetate. No instrumental analysis has been done, so the fibre type can't be identified with 100% certainty. The examined sample of vegetable fibres (10) are Cotton. Item 2 consists in approximately 50 fibers of the color violet. The examinded sample fibres (25) are manufactured, probably Acetate. No instrumental analysis has been done, so the fibre type can't be identified with 100% certainty. Item 3 consists in approximately 50 fibers of the color violet. The examinded sample fibres (25) are manufactured, probably Acetate. No instrumental analysis has been done, so the fibre type can't be identified with 100% certainty. After comparison, we have come to the conclusion, that item 3 could not have come from item 1. After comparison and application of mentioned procedures, the examined fibres of item 3 could not have been differenciated from the fibres. [sic]
NECZRP	Examination of Exhibit 1 (known section of yarn from the victim’s hat) disclosed the presence of purple rayon and purple silk fibers. Techniques utilized in this examination include polarized light microscopy and Fourier transform infrared spectroscopy. Examination of Exhibit 2 (known section of yarn from the victim’s scarf) disclosed the presence of purple acrylic fibers. Techniques utilized in this examination include polarized light microscopy and Fourier transform infrared spectroscopy. Examination of Exhibit 3 (questioned fibers from the suspect’s coat) disclosed the presence of purple acrylic fibers that are consistent with the fibers that compose Exhibit 2. Therefore, these purple acrylic fibers originated from Exhibit 2 or another source with the same characteristics. Techniques utilized in this examination include stereomicroscopy, polarized light microscopy, comparison/fluorescence microscopy, microspectrophotometry, and Fourier transform infrared spectroscopy. Examination of Exhibit 3 did not

TABLE 4

WebCode	Conclusions
	disclose the presence of fibers that are consistent with the fibers that compose Exhibit 1. Techniques utilized in this examination include stereomicroscopy and polarized light microscopy.
NPVLTD	Microscopical examination of the questioned fibers in Item 3 revealed they were purple acrylic. Microscopical and instrumental analysis (FTIR) techniques were used to compare a sampling of these fibers to the fiber standards in Items 1 and 2. Analysis revealed that the questioned purple acrylic fibers from the suspect's coat in Item 3 were the same as the purple acrylic fibers from the victim's scarf in Item 2 with respect to color, organic chemical composition, and physical and microscopical characteristics. Based on these findings, the fibers recovered from the suspect's coat could have originated from the scarf, but not exclusively as other fibers might be indistinguishable from the submitted evidence. Further analysis revealed that the purple acrylic fibers from the suspect's coat were different from the purple rayon and silk fibers which comprised the victim's hat in Item 1. Based on these findings, the fibers recovered from the suspect's coat did not originate from the victim's hat.
NV29Q9	The questioned fibers in item 3 could have originated from the scarf as represented by the yarn in item 2 or another source of acrylic fibers with the same characteristics. The questioned fibers in item 3 did not originate from the hat as represented by the yarn in item 1.
P2HB2H	Item 3 is consistent to item 2.
P4RZQL	The purple acrylic fibers labeled "questioned fibers from the suspect's coat", item 3, are consistent in color, physical characteristics, and chemical composition as compared to the purple acrylic fibers labeled "known section of yarn from the victim's scarf", Item 2. Level III Association. The purple acrylic fibers labeled "questioned fibers from the suspect's coat", item 3, display differences in physical characteristics and chemical composition as compared to the blend of purple rayon fibers and purple silk fibers labeled "known section of yarn from the victim's hat", Item 1. Elimination.
P7C8NM	Items 1, 2, and 3 were examined macroscopically, microscopically, and instrumentally. Item 1 was found to be a yarn consisting of a mixture of purple rayon fibers and purple nylon fibers. Item 2 was found to be a yarn consisting of purple acrylic fibers. Item 3 consisted of several fibers that were found to be acrylic fibers. Comparison of the Item 3 fibers to the Item 1 yarn fibers shows that the Item 3 fibers are not similar to the Item 1 yarn fibers. The Item 3 fibers could not have originated from the Item 1 yarn. Comparison of the Item 3 fibers to the Item 2 yarn fibers shows that the Item 3 fibers are similar to the fibers from the Item 2 yarn. The Item 3 fibers could have originated from the Item 2 yarn. Note: Because textile materials are mass produced, it is not possible to state that a fiber originated from a particular textile source to the exclusion of all other textile materials composed of fibers which exhibit the same chemical and optical properties.
PAYKXQ	The questioned fibres from the suspect's coat (item 3) were purple acrylic fibres. The known section of yarn from the victim's scarf (item 2) contained purple acrylic fibres. These fibres had the same visual appearance, fluorescence properties and chemical composition as the questioned fibres from the suspect's coat. Therefore, the questioned fibres from the suspect's coat could have come from the victim's scarf or from another source of this type of fibres. The known section of yarn from the victim's hat (item 1) contained purple rayon and cotton fibres. Therefore the questioned fibres from the suspect's coat were different to the fibres from the victim's hat and have not come from this hat.
PTAG9A	Fibres from Item 3 are comparable with fibres from Item 2 regarding the morphology, chemical characteristics and generic class and could have originated from same source. Item 3 and Item 1 are not comparable.
PVVBV3	The trace fibers from the suspect's coat (Item 3) could have originated from the victim's scarf (Item 2).
PZAQNF	Exhibit 1 (known section of yarn from the susepcts[sic] hat) is composed of purple rayon and silk fibers. Exhibit 2 (known section of yarn from the victim's scarf) is composed of purple acrylic fibers. Purple

TABLE 4

WebCode	Conclusions
	acrylic fibers were observed in Exhibit 3 (questioned fibers from susepct's[sic] coat). The purple acrylic fibers observed in Exhibit 3 were consistent microscopically and in organic composition with the purple acrylic fibers observed in Exhibit 2. Therefore, the purple fibers in Exhibit 3 could have originated from Exhibit 2 and did not originate from Exhibit 1.
Q48R2H	The purple acrylic fibers found in Item 3 were identical to the purple acrylic fibers in Item 2 in color, general fiber type, and microscopic characteristics. This means that the fibers from the suspect's coat could have come from the victim's scarf. The fibers found in Item 3 were different from the fibers in Item 1. This means that the fibers from the suspect's coat did not come from the victim's hat.
QATPRQ	The fibres recovered from the suspect's coat (item 3) were found to consist of apparently round, non-delustered purple acrylic. The piece of yarn from the victim's scarf (item 2) was also found to consist of apparently round, non-delustered purple acrylic fibres. In relation to diameter, appearance, chemical composition and dye composition the fibres from the victim's scarf (item 2) were indistinguishable from the fibres recovered from the suspect's coat (item 3). Therefore these two samples may share a common origin. The piece of yarn from the victim's hat (item 1) was found to consist of pink rayon fibres and purple animal fibres (possibly silk). Therefore the recovered purple acrylic fibres from the suspect's coat could not have originated from this source.
QBRTK2	Item 1 is composed of three type of purple fibers. One type is manufactured fiber, without delustrant, longitudinal striations, dichroism under polarized light and with fluorescence. It's identified as rayon fiber by FTIR. The other two type are manufactured fibers, without delustrant, without dichroism under polarized light and fluorescence but with different result according to each type. They are identified as rayon fibers by FTIR. Item 2 is composed by a single type of purple fiber. It's manufactured fiber, without delustrant, whithout dichroism under polarized light and without fluorescence. It's identified as acrylic fiber by FTIR. Item 3 contains the same type of fiber that item 2. [sic]
QCEGUF	Purple acrylic fibers found in Item 3 exhibit the same microscopic characteristics and optical properties as the purple acrylic fibers comprising Item 2. Accordingly, these fibers are consistent with originating from Item 2 or another source comprised of fibers that exhibit the same microscopic characteristics and optical properties. The fibers in Item 3 are microscopically dissimilar to the fibers comprising Item 1. Accordingly, these fibers are not consistent with originating from the source of Item 1. The specimens were examined using stereomicroscopy, comparison microscopy, polarized light microscopy, fluorescence microscopy, microspectrophotometry and Fourier transform infrared spectroscopy.
QG9DJ7	Based on the microscopic examination, Item 1 appears to be a blend of two fibres sharing characteristics consistent with that of nylon and cotton, where cotton appears to proliferate to a higher degree. Items 2 and 3 share characteristics similar to one another and to acrylic fibers. It is possible therefore that the questioned fibers from the suspect's coat (Item 3) may have originated from the same source as Item 2 (yarn from the victim's scarf).
QPN8GN	Item 1 consisted of a length of dark purple 4 ply, s-twist yarn, approximately 3.2cm in length and 2mm in width, composed of a mixture of rayon (regenerated cellulose) and silk fibres. Item 2 consisted of a length of royal purple 4 ply, s-twist yarn, approximately 3.5cm in length and 2mm in width, composed of acrylic fibres. The forensic significance of fibres is partly dependant on the number of fibres present, and how common that fibre type and colour is in textile manufacturing. Item 3 contained numerous long royal purple acrylic fibres that were found to be indistinguishable from those in Item 2 by the examinations performed. The number, colour and length of the fibres present strongly supports the hypothesis that the fibres in Item 3 originated from the same source as Item 2. The fibres in Item 3 were different from those in Item 1 and, as such, could not have originated from the same source.
QQYYP6	Item 1 was a purple coloured yarn recovered from a hat. The yarn was comprised of a mixture of purple/pink regenerated cellulose fibres and purple silk fibres. Item 2 was a purple coloured yarn recovered from a scarf. The yarn was comprised of pink-purple acrylic fibres. Item 3 was a tuft of pink-purple acrylic fibres recovered from the alleged offender's coat. These fibres were found to be

TABLE 4

WebCode	Conclusions
	indistinguishable by microscopy and instrumental colour analysis from the pink-purple acrylic fibres which comprised the purple yarn from the scarf (Item 2). In my opinion, possible explanations for the findings include: - The pink-purple tuft of fibres recovered from the alleged offender's coat originated from the scarf. - The pink-purple tuft of fibres recovered from the alleged offender's coat did not originate from the scarf but must originate from another source. In my opinion, the findings provide moderately strong support for the pink-purple tuft of fibres having originated from the scarf rather than from another item.
QRBVTN	Purple acrylic fibers recovered from Item 3 exhibit the same microscopic characteristics and optical properties as the fibers comprising Item 2. Accordingly, these fibers are consistent with originating from the Item 2 scarf, or another source comprised of fibers that exhibit the same microscopic characteristics and optical properties. No other apparent transfer of textile fibers was detected between Items 1 and 2 and Item 3. The specimens were examined visually using stereomicroscopy, comparison microscopy, polarized light microscopy, fluorescence microscopy, and instrumentally using microspectrophotometry, and Fourier transform-infrared spectroscopy.
R77CHM	The fibres within item 3 were examined for fibres which could have originated from the hat, item 1 or the scarf, item 2. A sample of 40 fibres recovered from item 3 were found to be indistinguishable from the scarf fibres, item 2 by comparison microscopy and fluorescence examination. A sample of these matching fibres was further compared by Fourier Transform Infrared Spectroscopy (FTIR) and Thin Layer Chromatography (TLC) and found to be indistinguishable. These findings would provide strong support for the proposition that the scarf, or an item of identical fibre composition had been in contact with the jacket on which the fibres were recovered. In assessing the scale of support, I have utilised the following scale. No support, weak support, support and strong support.
R8YHLJ	CONCLUSIONS: The questioned fibers identified as from the suspect's coat (Item #3) originated from the victim's scarf (Item #2) or another source of textile material possessing fibers with the same distinct microscopic, optical, and chemical characteristics. The questioned fibers identified as from the suspect's coat (Item #3) did not originate from the victim's hat (Item #1). RESULTS: The questioned fibers identified as from the suspect's coat (Item #3) were examined to determine whether or not there are any fibers present that are consistent with the victim's hat (Item #1) and/or scarf (Item #2). The victim's hat (Item #1) is primarily composed of rayon and silk fibers. The victim's scarf (Item #2) is primarily composed of acrylic fibers. Examination and comparison of questioned fibers identified as from the suspect's coat (Item #3) reveals the presence of numerous fibers that are consistent in microscopic, optical, and chemical characteristics with the known fibers of the victim's scarf (Item #2). It is therefore concluded the questioned fibers originated from the victim's scarf (Item #2) or another source of textile material possessing fibers with the same distinct microscopic, optical, and chemical characteristics. Examination and comparison of questioned fibers identified as from the suspect's coat (Item #3) with known fibers of the victim's hat (Item #1) reveals they are inconsistent in microscopic, optical, and chemical characteristics. It is therefore concluded the questioned fibers did not originate from the victim's hat (Item #1). METHODS OF ANALYSIS: Examinations were performed visually, by stereo microscopy, brightfield/polarized light comparison microscopy, fluorescence microscopy, microspectrophotometry, and Fourier transform infrared microspectroscopy.
REHTPM	Methods: Microscopic examination of fibers is accomplished by using one or more analytical techniques including stereomicroscopy, comparison microscopy, polarized light microscopy, fluorescence microscopy, and instrumentally using microspectrophotometry and Fourier transform-infrared spectroscopy. The microscopic characteristics and optical properties determined by these techniques are used for the examination and comparison of fibers. Results of Examinations: Purple acrylic fibers found in Item 3 exhibit the same microscopic characteristics and optical properties as the fibers comprising Item 2. Accordingly, these fibers are consistent with originating from the source of Item 2, or another item comprised of fibers that exhibit the same microscopic characteristics and optical properties. The fibers in Item 3 are microscopically dissimilar to the fibers comprising Item 1. Accordingly, these fibers are not consistent with originating from the source of Item 1. The specimens were examined using stereomicroscopy, comparison microscopy, polarized light microscopy,

TABLE 4

WebCode	Conclusions
	fluorescence microscopy, microspectrophotometry and Fourier transform-infrared spectroscopy.
RHLGCP	Fibers from sample #3 could have originated from sample #2 (scarf).
RNA3KB	Conclusions: Items 1-3 were examined visually, microscopically and instrumentally by Fourier transform infrared spectrometry (FTIR). The acrylic fibers recovered from the suspect's coat (Item 3) were not consistent with the blend of rayon and silk fibers from the victim's hat (Item 1) in regards to color and fiber type. Based on the samples submitted and examined, the fibers on the suspect's coat could not have originated from the victim's hat. The acrylic fibers recovered from the suspect's coat (Item 3) were consistent with the acrylic fibers from the victim's scarf (Item 2) in regards to color, diameter and fiber type. Based on the samples submitted and examined, the fibers on the suspect's coat could have originated from the victim's scarf.
RP33DF	The purple acrylic fibers from item 3, the questioned fibers from the suspect's coat, display differences in physical characteristics and chemical composition as compared to the blend of purple rayon fibers and purple silk fibers from item 1, the known section of yarn from the victim's hat. Elimination. The purple acrylic fibers from item 3, the questioned fibers from the suspect's coat, are consistent in physical characteristics, chemical composition, and color as compared to the purple acrylic fibers from item 2, the known section of yarn from the victim's scarf. Level III association.
RPHCC9	The Item 3 questioned fibers (from the suspect's coat) were compared to the Item 2 known fibers (section of yarn from the victim's scarf). Items 3 and 2 corresponded with respect to color, fiber type (acrylic), microscopic characteristics (PLM), chemical composition (FTIR) and fluorescence. Therefore, the Item 3 fibers could have originated from the same source as Item 2 (Type 3 Association). It should be noted that since similar items may have been manufactured which would be indistinguishable from the submitted evidence, an individual source cannot be determined. Also, additional testing (MSP) could add discrimination, but was currently not available at this time. Additional testing could be done at a later time. The Item 3 questioned fibers were a different fiber type (acrylic) than the Item 1 known fibers (rayon and silk). Therefore, Item 1 can be eliminated as a possible source of the Item 3 fibers (Elimination). Key for Instrument Acronyms: PLM – Polarized Light Microscopy FTIR – Fourier Transform Infrared Spectroscopy MSP – Microspectrophotometry. Interpretation: The following descriptions are meant to provide context to the opinions reached in this report. Every type of conclusion may not be applicable in every case or for every material type. Type 1 Association: Identification. An association in which items share individual characteristics and/or physically fit together that demonstrate the items were once from the same source. Type 2 Association: Highly likely. An association in which items correspond in all measured physical properties, chemical composition and/or microscopic characteristics and share distinctive characteristic(s) that would not be expected to be found in the population of this evidence type. The distinctive characteristics were not sufficient for a Type 1 Association. Type 3 Association: Could have. An association in which items correspond in all measured physical properties, chemical composition and/or microscopic characteristics and could have originated from the same source. Because it is possible for another sample to be indistinguishable from the submitted evidence, an individual source cannot be determined. Type 4 Association: Cannot eliminate. An association in which items correspond in some but possibly not all measured physical properties, chemical composition and/or microscopic characteristics and cannot be eliminated as coming from the same source. This type of evidence may be commonly encountered in the environment, may have limited comparative value and/or there may be factor(s) limiting the comparison. Inconclusive: No conclusion could be reached regarding an association between the items. Elimination: Items exhibit dissimilarities in one or more of the following: physical properties, chemical composition or microscopic characteristics and, therefore, conclusively did not originate from the same source. Non-Association: Items exhibit dissimilarities but certain details or features are not sufficient for an Elimination.
RZLETY	Examination of Item 1 and Item 3 showed that the samples were not consistent with one another and therefore could not have originated from the same source. Examination of Item 2 and Item 3 showed that the samples exhibited the same optical and chemical characteristics; accordingly, these samples could have originated from the same source.

TABLE 4

WebCode	Conclusions
TGMG7X	The fibres found on the suspect's coat were microscopically and chemically indistinguishable from those used in the construction of the victim's scarf.
TLGDT4	The victim's scarf (item 2) comprises purple acrylic fibres indistinguishable from purple acrylic fibres found on the suspect's coat (item 3). The victim's hat (item 1) comprises purple viscose (rayon) and silk fibres which are different to the purple acrylic fibres found on the suspect's coat. We have considered two explanations for our findings: - the fibres on the suspect's coat came from the victim's scarf, or alternatively, - the fibres on the suspect's coat did not come from the victim's scarf, but from another item and happen to match by chance. In our opinion, our findings provide strong support for the first proposition rather than the second, therefore in our view there is strong support for the assertion that the fibres found on the suspect's coat came from the victim's scarf rather than from another source.
TMQKUB	Item 1 is composed of rayon and silk fibers having a different thickness. Item 2 contains acrylic fibers. Item 3 fiber is same as Item 2 in composition, thickness, MSP and others.
TQRL3K	1. Examination of Exhibit 1 (known section of yarn from the victim’s hat) disclosed the presence of purple silk fibers and maroon rayon fibers. Techniques utilized in this examination include stereomicroscopy, polarized light microscopy, and Fourier-transform infrared spectroscopy. 2. 1. Examination of Exhibit 2 (known section of yarn from the victim’s scarf) disclosed the presence of purple acrylic fibers. Techniques utilized in this examination include stereomicroscopy, polarized light microscopy, and Fourier-transform infrared spectroscopy. 3. Examination of Exhibit 3 disclosed the presence of purple acrylic fibers that are consistent with the fibers that compose Exhibit 2. Therefore, these fibers originated from Exhibit 2 or another source with the same characteristics. Techniques utilized in this examination include stereomicroscopy, polarized light microscopy, comparison microscopy, microspectrophotometry, and Fourier-transform infrared spectroscopy. 4. Examination of Exhibit 3 did not disclose the presence of fibers that are consistent with the fibers that compose Exhibit 1. Techniques utilized in this examination include stereomicroscopy and polarized light microscopy.
TUQXZ7	These questioned bright purple acrylic fibers (item 3) were subsequently found to be consistent with the known bright purple acrylic fibers which compose item 2 regarding their color, morphology, optical properties and fiber type. Based on the above observations, it is the opinion of this analyst that the questioned fibers (item 3) and the known fibers which compose item 2 are of the same type and could have originated from the same source. This analyst recognizes that other sources of fibers with properties consistent with the above fibers exist. These questioned bright purple acrylic fibers (item 3) were subsequently found to be inconsistent with the known dark purple rayon and light purple silk fibers which compose item 1 regarding their color, morphology, optical properties and fiber type.
TZYFYY	Based on comparisons to the hat (Item 1) and scarf (Item 2) as represented by the submitted exemplars: The questioned fibers from the coat (Item 3) could have originated from the scarf (Item 2) or from another source exhibiting all of the same analyzed characteristics. The questioned fibers from the coat (Item 3) could not have come from the hat (Item 1).
U928TK	Numerous purple acrylic fibers recovered from Item 3 exhibit the same microscopic characteristics and optical properties as the fibers comprising Item 2. Accordingly, these fibers are consistent with originating from the source of Item 2 or another textile whose fibers exhibit the same microscopic characteristics and optical properties. The numerous purple acrylic fibers recovered from Item 3 are microscopically dissimilar to the fibers comprising Item 1. Accordingly, these fiber[sic] are not consistent with originating from the source of Item 1. The specimens were examined visually using stereomicroscopy, comparison microscopy, polarized light microscopy, fluorescence microscopy and instrumentally using microspectrophotometry and fourier transform infrared spectroscpy[sic].
U9K9WY	Item 1, know[sic] yarn from victim's hat, is a 4 ply yarn consisting of mainly Rayon and Silk fibers. It also consists of a very small amount of polyester and cotton fibers. Item 2, know[sic] yarn from victim's scarf, is a 4 ply acrylic yarn. Item 3, Fibers found from suspect's coat, are of acrylic and could have come

TABLE 4

WebCode	Conclusions
	from victim's scarf.
UQNG33	Microscopic and instrumental examination of the fibers in Item 1 reveals the presence of Rayon and Silk fibers. The fibers in Item 3 were found to be Acrylic fibers. The fibers in Item 3 did not originate from the same source as the fibers in Item 1. Microscopic and instrumental examination and comparison of the fibers in Items 2 and 3 reveals similarities in terms of color, size, optical properties, and chemical composition. The fibers from Item 3 could have originated from the same source as the fibers in Item 2.
UXNXD8	Examination of Item 2 (Known section of yarn from the victim's scarf) revealed the presence of one purple yarn composed of acrylic fibers. These fibers were found to be consistent in color and composition to the purple acrylic fibers in Item 3 (Questioned fibers from the suspect's coat). Therefore, the fibers in Item 3 could have originated from the same source as Item 2. Examination of Item 1 (Known section of yarn from the victim's hat) revealed the presence of one purple yarn composed of multiple fiber types. None of the fibers comprising Item 1 were microscopically consistent with the fibers from Item 3. Therefore, the fibers from Item 3 could not have originated from the same source as Item 1.
UZRD3Y	The fibers found on the suspect's coat are consistent with the fibers from the victim's scarf.
W48RJ4	Item 1: Known section of dark purple (color) plied yarn from the victim's hat. Preliminary observation of constituent fibers by polarized light microscope (PLM), subsequently checked by solubility (70% sulfuric acid, H2SO4), and confirmed by Fourier transform infrared (FT IR) spectroscopy as the manufactured fiber, rayon. Item 2: Known section of dark purple (color) plied yarn from the victim's scarf. Preliminary observation of constituent fibers by polarized light microscope (PLM), subsequently confirmed by Fourier transform infrared (FT IR) spectroscopy as the manufactured fiber, acetate. Item 3: Unknown: Scant quantity of light purple/dark pink (color) loose fibers from the suspect's coat. Preliminary observation of constituent fibers by polarized light microscope (PLM) revealed surface scales, indicative of mammalian hair fiber. Confirmed by solubility (sodium hypochlorite, NaClO) as an animal fiber, wool. With respect to the questioned asked (1), "Could the questioned fibers (Item 3) have originated from either the victim's hat (Item 1) and/or the victim's scarf (Item 2)," the questioned fibers could not have originated from either the victim's hat (Item 1) or scarf (Item 2).
W84BL3	1) Purple acrylic fibres from Exhibit 3 did not originate from the source of Exhibit 1. 2) Purple acrylic fibres from Exhibit 3 originated either from the source of Exhibit 2 or from another source with fibres having color, structure and chemical characteristics indistinguishable from the purple acrylic fibres used in the construction of Exhibit 2.
W8BEJM	It was determined utilizing stereomicroscopic, comparison microscopic, polarized light microscopic and Fourier Transform Infrared Spectroscopy examinations that item 002 and item 003 are comprised of purple acrylic fibers and exhibit consistent physical characteristics. Therefore, item 002 cannot be eliminated as being possible source of the questioned fibers from item 003. It was determined utilizing stereomicroscopic, polarized light microscopic and Fourier Transform Infrared Spectroscopy examinations that item 001 and item 003 are comprised dissimilar fiber types. Therefore, item 001 can be eliminated as being the source of the questioned fibers from item 003.
WDA83G	On examination, I found: a) The questioned fibers from the suspect's coat (Item 3) and the fibers from the victim's scarf (Item 2) to be similar and could have come from the same source. b) The questioned fibers from the suspect's coat (Item 3) and the fibers from the victim's hat (Item 1) to be dissimilar and did not come from the same source.
WLZT9F	The fibers recovered from Exhibit 3, questioned fibers “from suspect’s coat,” were examined and compared visually and microscopically to fibers composing Exhibit 2, known section of yarn “from victim’s scarf,” and were found to be consistent in appearance, fiber type and microscopic characteristics. Therefore, Exhibit 3 could have come from Exhibit 2. The fibers recovered from Exhibit 3 were also examined and compared visually and microscopically to fibers composing Exhibit 1, known

TABLE 4

WebCode	Conclusions
	section of yarn "from victim's hat," and were found to be inconsistent in appearance, fiber type and microscopic characteristics. Therefore, Exhibit 3 did not come from Exhibit 1.
WYCUDL	The purple acrylic fibres recovered from the suspect's coat (item 3) either originated from the victim's scarf (item 2) or originated from another garment with indistinguishable fibres.
XEHGXZ	The questioned fibers from the suspect's coat (Item 3) are made up of one type of fibers, which exhibits the same microscopic characteristics and spectroscopic properties as the known section of yarn from the victim's scarf (Item 2). The FT/IR results showed that fibers from Item 2 and Item 3 are both acrylonitrile fibers. Therefore, the questioned fibers from the suspect's coat (Item 3) could have originated from the victim's scarf (Item 2). The known section of yarn from the victim's hat (Item 1) contain two types of fibers: the thick ones are rayon and the thin ones are silk, according to their infrared spectrum. Neither of them present the same microscopic characteristics or spectroscopic properties as the fibers from Item 3. Hence, the questioned fibers from the suspect's coat (Item 3) couldn't have originated from the victim's hat (Item 1).
XTLYTT	The questioned fibers (Item 3) identified as having come from the suspect's coat were compared to the known fibers comprising the yarns from the victim's hat (Item 1) and scarf (Item 2) for possible fiber associations. The questioned fibers from the suspect's coat and the known fibers from the victim's scarf were similar in all tests performed (polarized light microscopy, fluorescence microscopy, cross-section, and microspectrophotometry). Additionally, Infrared spectroscopy showed both the questioned and known fibers to be similar in chemical composition (acrylic). The victim's scarf is a possible source of the questioned fibers from the suspect's coat (Level 3 Association - See Association Scale). Because other items have been manufactured that would be indistinguishable from the submitted evidence, an individual source cannot be determined. The questioned fibers from the suspect's coat differed in microscopical properties and fiber type from the victim's hat. The victim's hat is eliminated as a possible source of the questioned fibers (Elimination).
Y33CY3	Results of Fiber Analysis- Microscopic and instrumental examination of the representative fibers from Item 1 revealed purple lusterous[sic] rayon and silk fibers. Microscopic and instrumental examination of the representative fibers from Item 2 revealed purple lusterous[sic] acrylic fibers. Microscopic and instrumental examination of the representative fibers from Item 3 revealed purple lusterous[sic] acrylic fibers. Results of Fiber Comparison- The representative purple fibers in Items 2 and 3 were found to be similar in microscopic, optical, chemical, and color properties. They could have come from the same source or any other source with the same properties. The representative purple fibers from Items 1 and 3 were found to be dissimilar in microscopic, optical and chemical properties. They could not have come from the same source.
Y6T4HZ	The fibers in the known section of yarn from victim's hat (Item 1) and the questioned fibers from the suspect's coat (Item 3) exhibited significant differences in optical characteristics and chemical composition, therefore the fibers in item 3 could not have originated from item 1. The fibers in the known section of yarn from the victim's scarf (Item 2) and the questioned fibers from the suspect's coat (Item 3) exhibited no significant differences in optical characteristics, color and chemical composition, therefore the fibers in item 3 could have originated from the same source as the fibers in item 2 or another source of the reddish purple acrylic fibers.
ZDGJJA	The questioned purple acrylic fibers from the suspect's coat (Item 3) were consistent in color and physical, chemical, and optical properties with the purple acrylic fibers used in the construction of the known section of yarn from the victim's scarf (Item 2) . It was concluded that the purple fibers from the suspect's coat (Item 3) could have originated from the victim's scarf (Item 2) or another source composed of fibers with the same physical, chemical, and optical properties. The questioned purple acrylic fibers from the suspect's coat (Item 3) could not be associated with the purple fibers from the yarn of the victim's hat (Item 1) due to differences in chemical and optical properties. Samples were examined by stereomicroscopy, polarized light microscopy, Fourier transform infrared spectroscopy, and microspectrophotometry.

TABLE 4

WebCode	Conclusions
ZJP3KM	Item 1 consists of one purple yarn approximately 35 mm long constructed from four strands with an "S" twist. The yarn is composed of a mixture of dark pink rayon fibers and purple silk fibers. Item 2 consists of one purple yarn approximately 35 mm long constructed from four strands with a "Z" twist. The yarn is composed of pinkish-purple acrylic fibers. Item 3 consists of a folded glassine envelope enclosing a tuft of pinkish- purple acrylic fibers. The acrylic fibers from Item 3 have similar chemical properties and similar microscopically observed morphology, optical properties, fluorescence, and color characteristics as the known fibers from Item 2. The fibers from Item 3 either originated from the source of the known fibers in Item 2 or from another fiber source with similar properties. The acrylic fibers from Item 3 could not have originated from the source of the known fibers in Item 1 due to differences in chemical composition and microscopically observed morphology, optical properties, and color characteristics. The fibers from Items 1, 2, and 3 were analyzed using stereomicroscopy, polarized light microscopy, and Fourier transform infrared micro-spectroscopy. The fibers from Items 2 and 3 were also analyzed using fluorescence microscopy and comparison microscopy.
ZM4FKB	The purple fibers (Item 3) recovered from the suspect's coat and purple fibers from the victim's scarf (Item 2) were examined for microscopic appearance and chemical composition and no difference[sic] were identified. Therefore, the fibers examined in Item 3 could have come from the victim's scarf (Item 2) or any other source containing similar fibers. The purple fibers from the victim's hat (Item 1) were examined for microscopic appearance and chemical composition and were found to be different than the fibers (Item 3) recovered from the suspect's coat.
ZU7M4J	Fibers recovered from Item 3, questioned fibers "from the suspect's coat," were examined and compared visually and microscopically to fibers composing Item 2, known section of yarn "from the victim's scarf," and were found to be consistent in appearance, generic fiber type, and microscopic characteristics. Therefore, the fibers recovered from Item 3 could have come from Item 2. Fibers recovered from Item 3 were also examined and compared visually and microscopically to fibers composing Item 1, known section of yarn "from the victim's hat," and were found to be different in appearance, fiber types, and microscopic characteristics. Therefore, the fibers recovered from Item 3 did not come from Item 1.
ZYLZ68	The known standards and questioned sample were characterized to determine their individual color, chemical, and microscopic characteristics. The individual color, chemical, and microscopic characteristics of the unknown sample were then compared to those of the known standards. Lab Item 1 (1) - Known section of yarn from Victim's hat: The item contained one piece of dark purple yarn. The yarn was constructed of red-purple dyed manufactured fibers and purple dyed natural fibers. Lab Item 2 (2) - Known section of yarn from Victim's scarf: The item contained one piece of dark purple yarn. The yarn was constructed of purple dyed acrylic fibers. Lab Item 3 (3) - Questioned fibers from Suspect's coat: The item contained numerous purple dyed acrylic fibers. All of the fibers had a similar appearance. A representative sample of the fibers was examined. Significant differences in color and fiber types were observed between the fibers in lab Item 3 and the fibers in lab Item 1. Therefore, the fibers recovered from the suspect's coat (Item 3) were not consistent with originating from the victim's scarf[sic] (Item 1). This is an Exclusion. The color, chemical, and microscopic characteristics of the purple acrylic fibers from Item 3 were indistinguishable from the color, chemical, and microscopic characteristics of the purple acrylic fibers from Item 2. Therefore, the purple fibers recovered from the suspect's coat (Item 3) could have come from victim's scarf (Item 2), or any other source with purple acrylic fibers which have indistinguishable color, chemical, and microscopic characteristics. This is a Type III Association.

Additional Comments

TABLE 5

WebCode	Additional Comments
2FLB6V	The item 1 is composed of a mixture of fibers. We could not identify one of the types of fibers have a coating.[sic] This coating causes a different behavior in the center and at the edges of the fiber when irradiated by polarized light.
2JXJ7Z	The FTIR microscope was not available for analysis for item 3. Due to sample size, the FTIR-ATR was not suitable for analysis. Item 1 contains more than one type of fiber. The manufactured fiber, rayon, and a natural animal fiber such as silk were detected.
33U37T	Item 1 is comprised of two different colors of rayon fibers.
3T82NX	The multiple fiber types in Lab Item # 1 were not identified in accordance with laboratory policy which states: If at any point during the course of examination the items are found to be inconsistent with one another, analysis may be halted and a lab report shall be issued stating a negative finding.
699WPU	Fibres from Item 3 and fibres from Item 1 are not comparable.
6D7743	These report findings are based on the presumption that the purple yarn samples provided from both Item 1 and Item 2 are a representative sample of each item and that each of these items are constructed of only one yarn source.
7PTX6H	HPLC-DAD-MS indicates that the scarf (item 2) and the fibre traces (item 3) are dyed using a mixture of different dyes, including Basic Red 46. Two other (not completely identified) dyes are observed (a basic blue and a basic orange dye). The ratios of the mentioned dyes in items 2 and 3 are not equal. We attribute this to a within-variation of the donor.
A8Z8DK	Examinations Conducted: Polarized Light Microscopy (PLM) Fourier Transform Infrared Spectrophotometry (FTIR) Microspectrophotometry (MSP) Fluorescence Microscopy
AQG64C	One fibre in Item 3 was found to be lighter and duller purple in colour compared to the rest of the fibres sampled from Item 3. The fluorescence colours were also subtly different. No such fibres were seen in Item 2. More attempts were made to sample more fibres from Item 3 to ascertain the presence of the lighter and duller purple fibres and none were found.
BBUN3J	The presence of distinctive "matching" fibres is, in my opinion, unlikely to be due to a chance match. In order to further evaluate these findings additional information as to the timing of the alleged offence, when items were seized and the shedability and retentive properties of the items of clothing involved would be required.
CUQ6D9	Items 2 and 3: acrylic fibres (PAN/VA), regular in diameter with a average diameter of about 17μm, pink microscopic colour and purple macroscopic colour, round cross-section with a slightly crenellated edge. MSP spectra are identical and RAMAN spectra (lasers : 532, 632 and 785 nm) also. TLC was performed and the results are identical which indicate a disperse dye (eluent : n-butanol, acetone, water, ammonia (5/5/1/2), extraction solvent : pyridine/water (4/3), results : 4 spots (orange, orange, pink, blue). Items 3[sic] : fuchsia viscose fibres with a diameter between 17 and 31 μm and others fibres with heterogeneous colours and shape (colourless, dark to pale purple, along the fibre or between fibres, some fibres support dye smeared on the surface). RAMAN spectra are different from the RAMAN spectra of items 2 and 3).
HDMJBN	The thin fibers from Item 1 appear to most likely be silk fibers. Once it was apparent that Item 3 was different from Item 1, no extra steps were taken to confirm that the thin fibers from Item 1 were, in fact, silk.

TABLE 5

WebCode	Additional Comments
HDXRV9	No colour analysis was performed because this laboratory does not have a microspectrophometer[sic] (MSP).
HNXBG9	Because textile materials are mass produced, it is not possible to state that a fiber originated from a particular textile source to the exclusion of all other materials composed of fibers which exhibit the same chemical and optical properties.
QATPRQ	The fibres from the piece of yarn from the victim's hat (item 1) was excluded as possibly originating from the same source as the questioned fibres (item 3) based on visual appearance. This laboratory would not normally examine this item further and determine fibre type. The method employed in this laboratory is targeted at man-made fibres and not naturally derived fibres.
QCEGUF	Interpretation: Fibers can differ as to type (e.g. rayon, cotton), color, shape, size, microscopic features (e.g., presence of delustering agents, voids) and optical properties (e.g., refractive index, sign of elongation). These are characteristics that may associate fibers with a group of items, but never to a single item to the exclusion of all others. However, even fibers with many similar properties may be excluded as originating from the same source by using the identified analytical methods. The characteristics present in the fibers are used as comparison criteria. When all of the characteristics present in a recovered fiber are the same as in a potential source, the possibility that the compared fibers originated from the same source cannot be excluded. Consequently, the recovered fibers are consistent with originating from the known source, or from another source comprised of fibers that exhibit the same microscopic characteristics and optical properties. The inability to associate persons/items through a microscopic hair/fiber examination does not necessarily mean the persons/items of interest had no contact. A number of factors can produce this result, including: 1) Hair/fiber evidence may not have transferred. 2) Hairs/fibers that did transfer may have been lost prior to submission to the laboratory. 3) The hairs/fibers transferred or the known sample submitted may not be representative of the source. 4) The hairs/fibers transferred may be from a different source.
QG9DJ7	The FTIR is usually used as a confirmatory test when manufactured fibres are present. At this time however, the machine is currently not working efficiently and was therefore not used. No other confirmatory pieces of equipment are present in the laboratory. [From Table 2 - Fiber Type Determination, Item 1: "possible 70% Cotton, 30% Nylon"]
QPN8GN	Due to instrument limitations, analysis by microspectrophotometry and pyrolysis gas chromatography mass spectrometry was not possible. These techniques may have provided further discrimination.
R77CHM	The fibres eliminated by high power microscopy from item 1 would not have been subjected to further identification tests in normal casework within this laboratory.
TZYFYY	Because fibers are mass produced, it is not possible to state that a fiber originated from a particular textile source to the exclusion of all other materials composed of fibers which exhibit the same chemical and optical properties.
U9K9WY	Cotton and polyester fibers in item 1, may be contamination at the time of fiber blending.
UXNXD8	According to the Technical Procedure for the Examination of Fibers at the this[sic] Laboratory, if at any point during the course of examination items are found to be inconsistent with one another, analysis may be halted and a lab report issued stating a negative finding.
W84BL3	Acrylic fibres are used in the construction of, but are not limited to, blankets, clothing (e.g. jackets, scarves, sports wear and sweaters), draperies and upholstery fabrics.
WLZT9F	Due to the fact that textile materials are mass produced, it is not possible to state that a fiber originated from a particular source to the exclusion of all other textile materials composed of fibers which exhibit

TABLE 5

WebCode	Additional Comments
	the same physical, optical, and/or chemical properties.
XTLYTT	An Association Scale would be attached to the report.
ZU7M4J	Due to the fact that textile materials are mass produced, it is not possible to state that the questioned fibers in this case originated from a particular source to the exclusion of all other textile materials composed of fibers which exhibit the same physical, optical, and/or chemical properties.

Appendix: Data Sheet

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Collaborative Testing Services ~ Forensic Testing Program

Test No. 15-539: Fibers Analysis

DATA MUST BE RECEIVED BY ***March 23, 2015*** TO BE INCLUDED IN THE REPORT

Participant Code: WebCode:

Accreditation Release Statement

CTS submits external proficiency test data directly to ASCLD/LAB and ANSI-ASQ NAB/FQS. Please select one of the following statements to ensure your data is handled appropriately.

☐ This participant's data is intended for submission to ASCLD/LAB and/or ANSI-ASQ NAB/FQS. (Accreditation Release section on the last page must be completed and submitted.)

☐ This participant's data is NOT intended for submission to ASCLD/LAB or ANSI-ASQ NAB/FQS.

Online Data Entry

Visit www.cts-portal.com to enter your proficiency test results online. If you have any questions please do not hesitate to contact CTS.

Scenario:

Police are investigating the assault and robbery of a woman walking to work. The victim was wearing a purple, knitted hat and scarf during the incident. The victim's description led to a suspect and fibers were recovered from his winter coat. Police are requesting you to examine the fibers, report their identification(s), and determine if the fibers found on the suspect's coat could have come from the hat and/or scarf worn by the victim.

CTS will not reproduce Interpretation Scales, Scale of Conclusions or Terminology Keys in the final report, please do not submit with the participant's data sheet.

Items Submitted (Sample Pack FIBR):

1: Known section of yarn from the victim's hat

2: Known section of yarn from the victim's scarf

3: Questioned fibers from the suspect's coat

Please return all pages of this data sheet.

Participant Code:

WebCode:

1.) Could the questioned fibers (Item 3) have originated from either the victim's hat (Item 1) and/or the victim's scarf (Item 2)?

Item 1 (Known yarn from the victim's hat)	*Item 2 (Known yarn from the victim's scarf)*
Item 3: Yes ☐ No ☐ Inc ☐	**Item 3:** Yes ☐ No ☐ Inc ☐

2.) Fiber Type Determination.

Please enter the fiber type (Manufactured, Animal, or Vegetable) and generic name in the blank provided for each Item. For Manufactured fibers please use the terminology in the appendix provided.
(*Example:* Item 1 Vegetable, Cotton)

Item 1 _____

Item 2 _____

Item 3 _____

3.) Indicate the procedure(s) used to examine the submitted items:

Microscopic Exams:

☐ Stereomicroscope ☐ Comparison

☐ Polarized Light ☐ Fluorescence

☐ Macroscopic Exam ☐ IR/FTIR ☐ Microspectrophotometry

☐ Solubility Tests ☐ Cross-Section ☐ Melting Point

☐ Other (specify): _____

Please return all pages of this data sheet.

Participant Code:

WebCode:

4.) What would be the wording of the Conclusions in your report?

5.) Additional Comments

Return Instructions: Data must be received via online data entry, fax (please include a cover sheet), or mail by ***March 23, 2015*** to be included in the report.

QUESTIONS?
TEL: +1-571-434-1925 (8 am - 4:30 pm EST)
EMAIL: forensics@cts-interlab.com
www.ctsforensics.com

Participant Code:

ONLINE DATA ENTRY: www.cts-portal.com

FAX: +1-571-434-1937
or Toll-Free: 1-866-FAX-2CTS (329-2287)

MAIL: Collaborative Testing Services, Inc.
P.O. Box 650820
Sterling, VA 20165-0820 USA

Please return all pages of this data sheet.

Collaborative Testing Services ~ Forensic Testing Program

RELEASE OF DATA TO ACCREDITATION BODIES

The following Accreditation Releases will apply only to:

Participant Code: WebCode:

for Test No. **15-539: Fibers Analysis**

This release page must be completed and received by ***March 23, 2015*** to have this participant's submitted data included in the reports forwarded to the respective Accreditation Bodies.

ASCLD/LAB RELEASE

If your lab has been accredited by ASCLD/LAB and you are submitting this data as part of their external proficiency test requirements, have the laboratory's designated individual complete the following.
The information below must be completed in its entirety for the results to be submitted to ASCLD/LAB.

ASCLD/LAB Legacy Certificate No. _____ ASCLD/LAB International Certificate No. _____

Signature _____ Date _____

Laboratory Name _____

Location (City/State) _____

ANSI-ASQ NAB/FQS RELEASE

If your laboratory maintains its accreditation through ANSI-ASQ NAB/FQS, please complete the following form in its entirety to have your results forwarded.

ANSI-ASQ NAB/FQS Certificate No. _____

Signature and Title _____ Date _____

Laboratory Name _____

Location (City/State) _____

Accreditation Release

Return Instructions

Please submit the completed Accreditation Release at the same time as your full data sheet. See Data Sheet Return Instructions on the previous page.

Questions? Contact us 8 am-4:30 pm EST
Telephone: +1-571-434-1925
email: forensics@cts-interlab.com

Please return all pages of this data sheet.

Appendix: Manufactured Fibers - Names & Definitions

Federal Trade Commision

Rules and Regulations Under the Textile Fiber Products Identification Act

16 CFR Part 303

§303.7 Generic Names and Definitions for Manufactured Fibers

Pursuant to the provisions of Section 7(c) of the Act, the Commission hereby establishes the generic names for manufactured fibers, together with their respective definitions, set forth in this section, and the generic names for manufactured fibers, together with their respective definitions, set forth in International Organization for Standardization ISO 2076: 2010(E), "Textiles – Man-made fibres – Generic names."

(a) **Acrylic**

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85% by weight of acrylonitrile units.

(b) **Modacrylic**

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of less than 85% but at least 35% by weight of acrylonitrile units, except fibers qualifying under paragraph (j)(2) of this section and fibers qualifying under paragraph (q) of this section.

(c) **Polyester**

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85% by weight of an ester of a substituted aromatic carboxylic acid, including but not restricted to substituted terephthalate units, and para substituted hydroxy-benzoate units. (1) Where the fiber is formed by the interaction of two or more chemically distinct polymers (of which none exceeds 85% by weight), and contains ester groups as the dominant functional unit (at least 85% by weight of the total polymer content of the fiber), and which, if stretched at least 100%, durably and rapidly reverts substantially to its unstretched length when the tension is removed, the term elasterell-p may be used as a generic description of the fiber. (2) Where the glycol used to form the ester consists of at least ninety mole percent 1,3-propanediol, the term "triexta" may be used as a generic description of the fiber.

(d) **Rayon**

A manufactured fiber composed of regenerated cellulose, as well as manufactured fibers composed of regenerated cellulose in which substituents have replaced not more than 15% of the hydrogens of the hydroxyl groups. Where the fiber is composed of cellulose precipitated from an organic solution in which no substitution of the hydroxyl groups takes place and no chemical intermediates are formed, the term lyocell may be used as a generic description of the fiber.

(e) **Acetate**

A manufactured fiber in which the fiber-forming substance is cellulose acetate. Where not less than 92% of the hydroxyl groups are acetylated, the term triacetate may be used as a generic description of the fiber.

(f) **Saran**

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 80% by weight of vinylidene chloride units.

(g) **Azlon**

A manufactured fiber in which the fiber-forming substance is composed of any regenerated naturally occurring proteins.

(h) **Nytril**

A manufactured fiber containing at least 85% of a long chain polymer of vinylidene dinitrile where the vinylidene dinitrile content is no less than every other unit in the polymer chain.

(i) **Nylon**

A manufactured fiber in which the fiber-forming substance is a long chain synthetic polyamide in which less than 85% of the amide linkages are attached directly to two aromatic rings.

(j) **Rubber**

A manufactured fiber in which the fiber-forming substance is comprised of natural or synthetic rubber, including the following categories: (1) A manufactured fiber in which the fiber-forming substance is a hydrocarbon such as natural rubber, polyisoprene, polybutadiene, copolymers of dienes and hydrocarbons, or amorphous (noncrystalline) polyolefins. (2) A manufactured fiber in which the fiber-forming substance is a copolymer of acrylonitrile and a diene (such as butadiene) composed of not more than 50% but at least 10% by weight of acrylonitrile units. The term lastrile may be used as a generic description for fibers falling within this category. (3) A manufactured fiber in which the

fiber-forming substance is a polychloroprene or a copolymer of chloroprene in which at least 35% by weight of the fiber-forming substance is composed of chloroprene units.

(k) **Spandex**

A manufactured fiber in which the fiber-forming substance is a long chain synthetic polymer comprised of at least 85% of a segmented polyurethane.

(l) **Vinal**

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 50% by weight of vinyl alcohol units, and in which the total of the vinyl alcohol units and any one or more of the various acetal units is at least 85% by weight of the fiber.

(m) **Olefin**

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85% by weight of ethylene, propylene, or other olefin units, except amorphous (noncrystalline) polyolefins qualifying under paragraph (j)(1) of this section. Where the fiber-forming substance is a cross-linked synthetic polymer, with low but significant crystallinity, composed of at least 95% by weight of ethylene and at least one other olefin unit, and the fiber is substantially elastic and heat resistant, the term lastol may be used as a generic description of the fiber.

(n) **Vinyon**

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85% by weight of vinyl chloride units.

(o) **Metallic**

A manufactured fiber composed of metal, plastic-coated metal, metal-coated plastic, or a core completely covered by metal.

(p) **Glass**

A manufactured fiber in which the fiber-forming substance is glass.

(q) **Anidex**

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 50% by weight of one or more esters of a monohydric alcohol and acrylic acid.

(r) **Novoloid**

A manufactured fiber containing at least 85% by weight of a cross-linked novolac.

(s) **Aramid**

A manufactured fiber in which the fiber-forming substance is a long-chain synthetic polyamide in which at least 85% of the amide linkages are attached directly to two aromatic rings.

(t) **Sulfar**

A manufactured fiber in which the fiber-forming substance is a long chain synthetic polysulfide in which at least 85% of the sulfide linkages are attached directly to two (2) aromatic rings.

(u) **PBI**

A manufactured fiber in which the fiber-forming substance is a long chain aromatic polymer having reoccurring imidazole groups as an integral part of the polymer chain.

(v) **Elastoester**

A manufactured fiber in which the fiber-forming substance is a long-chain synthetic polymer composed of at least 50% by weight of aliphatic polyether and at least 35% by weight of polyester, as defined in 16 CFR 303.7©.

(w) **Melamine**

A manufactured fiber in which the fiber-forming substance is a synthetic polymer composed of at least 50% by weight of a cross-linked melamine polymer.

(x) **Fluoropolymer**

A manufactured fiber containing at least 95% of a long-chain polymer synthesized from aliphatic fluorocarbon monomers.

(y) **PLA**

A manufactured fiber in which the fiber-forming substance is composed of at least 85% by weight of lactic acid ester units derived from naturally occurring sugars.

