

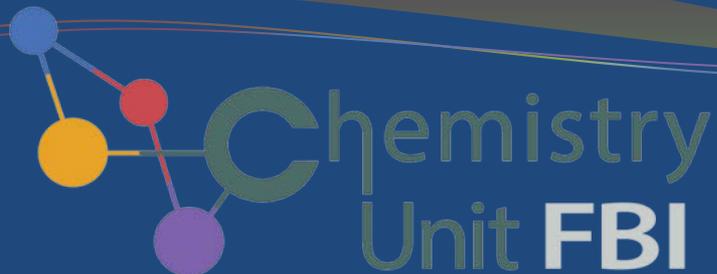
The Application of Forensic Databases to Paint and Tape Analyses



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Polymer Databases

- National Automotive Paint File
- National Forensic Tape File

National Automotive Paint File

- A *physical* collection of OEM automotive color standards and full system factory panels
- Arranged by color using the Munsell system
- Used for side-by-side color comparisons as well as to develop color codes for unknown automotive paint evidence
- Over 12,300 panels in NAPF representing color codes from the ~ 1975 - present

National Automotive Paint File



Unclassified

How NAPF differs from PDQ

- Color codes correlate to specific manufacturers
 - Color codes used across multiple plants that make a specific vehicle
- Physical collection
 - Not able to be easily shared across labs

Screenshot of NAPF search

07/07/2016

National Automotive Paint File (NAPF) Search

(Underlined Captions = Multi select field) (Italicized Captions = Scan fiel

Panel ID:

Munsell Hue: **+ - 0 (Def.)**
Range: to **+ - 2.5**
+ - 5

Value (0.0 to 10.0): **+ - 0 (Def.)**
Range: to **+ - 1**
+ - 2

Chroma (0.0 to 20.0): **+ - 0 (Def.)**
Range: to **+ - 2**
+ - 4

Panel Information

Layer Structure: **Color Standard** 0
 Full System

Substrate Type: **Metal** 0
 Paper

Auto Manuf: **Alfa Romeo** 0
 AMC (Now Chrysler)

1st Year used:

Auto Manuf. ***** No Color Entered ***** 0
Color Name: **26.2 Yellow**

Metallic/Non-Metallic:

Auto Manuf.
Color Name:

Layer System:

Visual Color: **Beige** 0
 Black

Paint Chemistry: **Acrylic Enamel** 0
 Acrylic Lacquer

Paint Manuf: **AD Color**
 Adam Opel AG

Comment:

Code (1,2,3 or 4):

FBI Number: **Clear Coat Val.**

EDPN Number: **FTIR Run:**

NAPF Number: **Sent to RCMP:**

Inactive Data

- Clear Form**
- Search (Panel ID)**
- Search (Hue-Value-Chroma)**
- Search (Auto Manuf. Color Name)**
- Search (Visual Color)**
- Search (Codes 1-4)**
- Close (Main Menu)**

07/07/2016

NAPF Database Search Results by Panel ID

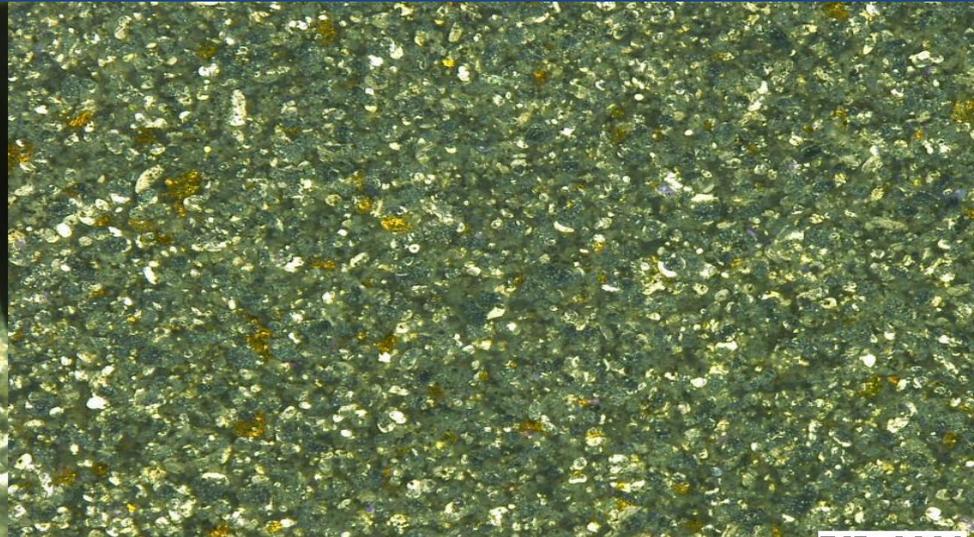
Panel ID	Hue	Value	Chrom	Auto Manuf.	Auto Manuf. Color Name	Visual Color	Met/Non-Met
2	1.1YR	3.6	8.5	Mercedes Benz	ENGLISH RED	Orange	Non-Meta
33	1.9BG	8.7	0.3	General Motors	White	White	Non-Meta
34	5.4PB	2.0	1.2	Ford	*** No Color Entered ***	Gray	Metallic
35	2.9GY	9.0	0.5	Ford	White	White	Non-Meta
36	2.8P	1.4	0.2	General Motors	DARK OTTER METALLIC	Gray	Metallic
37	6.9Y	7.7	0.6	General Motors	EURO WHITE	White	Metallic
39	1.6G	9.0	0.4	General Motors	CLASSIC WHITE	White	Non-Meta
40	6.7Y	8.8	0.8	General Motors	White	White	Non-Meta
41	0.2GY	8.8	0.7	General Motors	COTILLION WHITE	White	Non-Meta
42	6.8Y	8.8	0.9	General Motors	White	White	Non-Meta
43	7.6Y	8.9	0.7	General Motors	COTILLION WHITE	White	Non-Meta
44	4.1R	0.5	1.7	Ford	Dark CABERNET	Maroon	Metallic
49	7.4Y	8.8	0.8	General Motors	White	White	Non-Meta
50	7.4Y	8.9	0.7	General Motors	COTILLION WHITE	White	Non-Meta
55	3.4GY	8.7	0.5	General Motors	COTILLION WHITE	White	Non-Meta
56	1.3BG	8.2	0.5	General Motors	White	White	Non-Meta
57	6.5Y	8.9	0.8	General Motors	COTILLION WHITE	White	Non-Meta
59	6.8Y	8.9	0.7	General Motors	White	White	Non-Meta
62	4.2PB	0.1	0.2	General Motors	SABLE BLACK	Black	Non-Meta
70	4.0PB	0.2	0.3	General Motors	BLACK	Black	Non-Meta
72	6.5PB	0.1	0.2	General Motors	BLACK	Black	Non-Meta
75	0.8P	0.1	0.1	General Motors	SABLE BLACK	Black	Non-Meta
76	5.3PB	0.1	0.2	General Motors	SABLE BLACK	Black	Non-Meta
77	8.2PB	0.2	0.0	General Motors	BLACK	Black	Non-Meta
81	9.9YR	6.7	1.2	General Motors	LIGHT SAND GRAY	Beige	Non-Meta
82	9.7YR	6.7	1.0	General Motors	LIGHT SAND GRAY	Gray	Non-Meta
84	9.2G	6.7	0.3	General Motors	SLATE GRAY	Gray	Non-Meta
86	8.3GY	6.0	0.2	General Motors	Platinum	Silver	Metallic
87	1.2G	6.3	0.0	General Motors	Silver	Silver	Metallic
92	7.5PB	4.3	0.7	General Motors	SHEFFIELD GRAY	Gray	Metallic
93	6.4Y	6.1	1.0	General Motors	Gray	Gray	Non-Meta

Unclassified

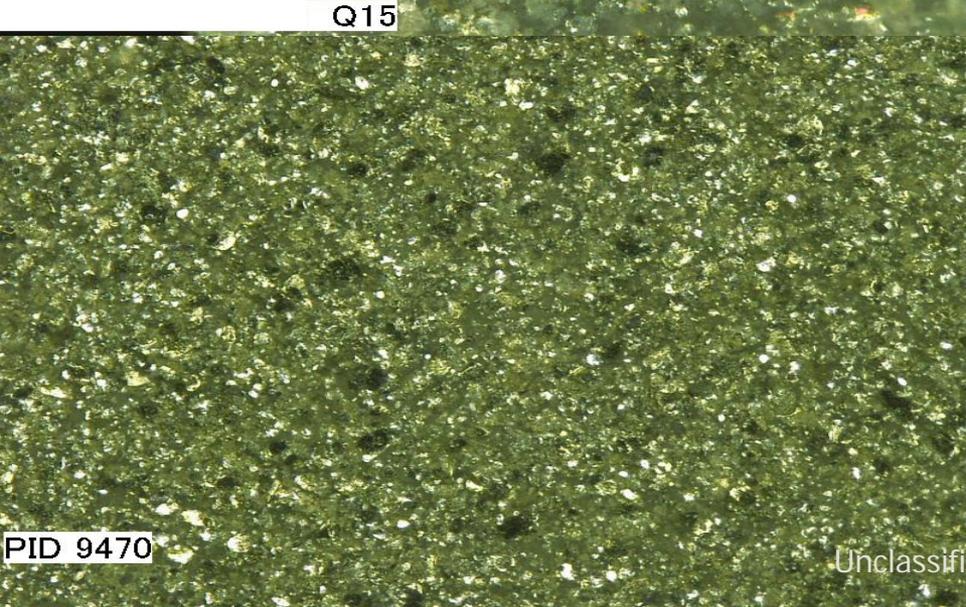
Comparing NAPF panels to casework



Q15

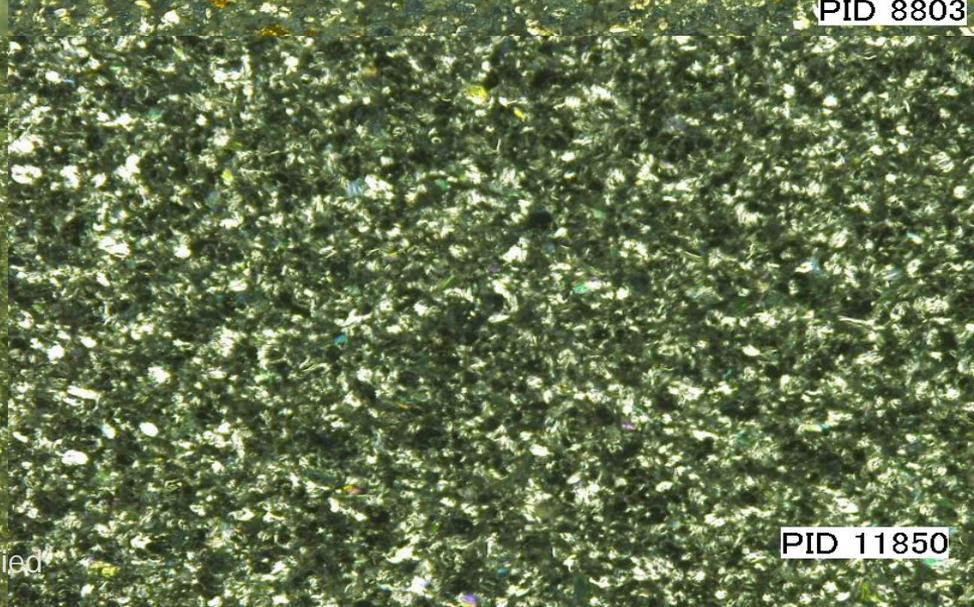


PID 8803



PID 9470

Unclassified



PID 11850

87/WA852J Orange Met

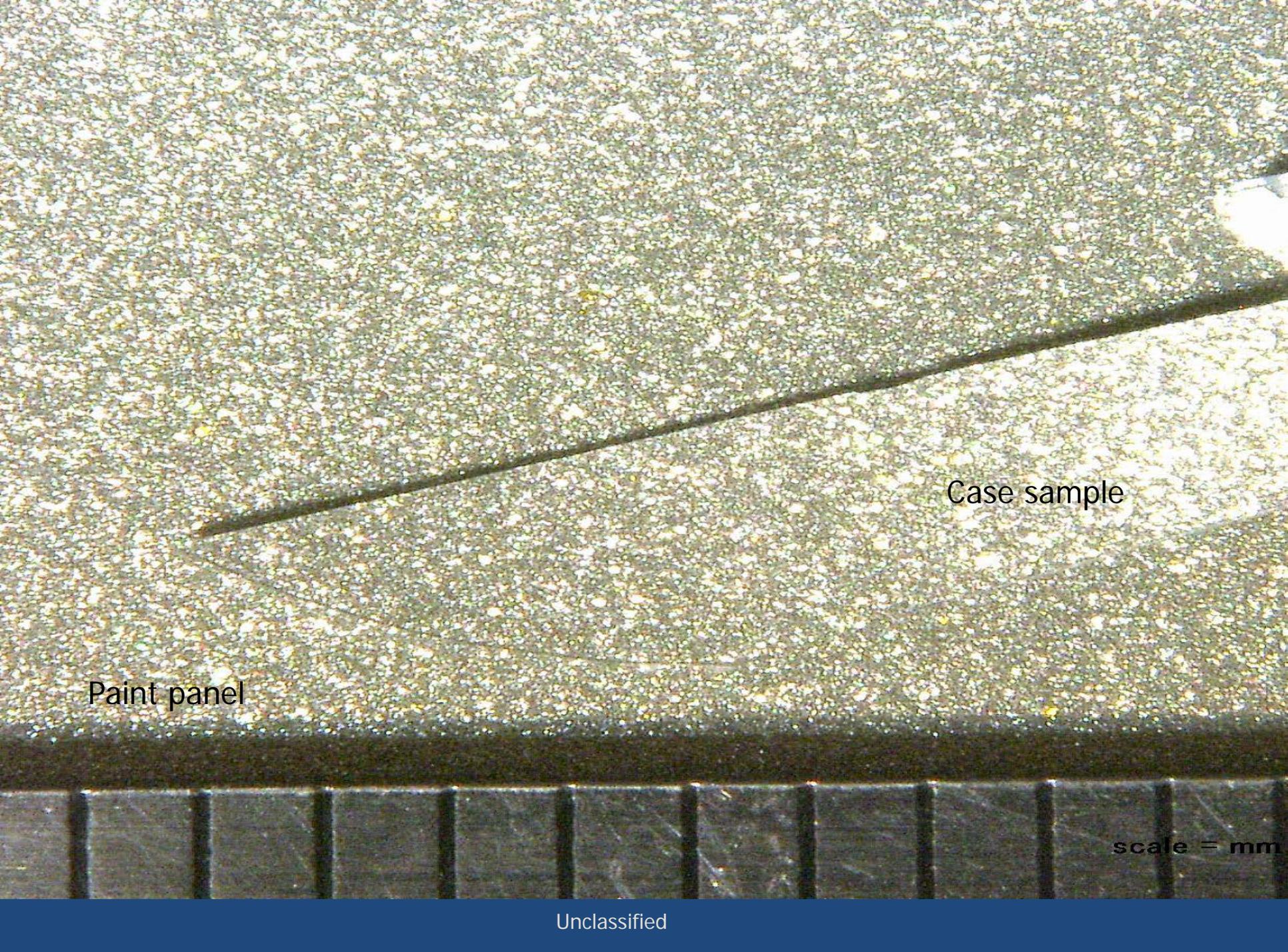
scale = mm

case paint chip

dmw;2/11/15; 50x

69/WA381E Copper Met

case paint chip



Paint panel

Case sample

scale = mm

Automotive Paint Cases

- NAPF is best used to complement PDQ
- Automotive Color info books also useful
 - Axalta, BASF, PPG, Sherwin-Williams, etc.
 - Paper-based color plates provide color codes
 - Some also provide models where used

Series of consecutive model year (MY) books provide MY range for both PDQ and NAPF use

National Forensic Tape File

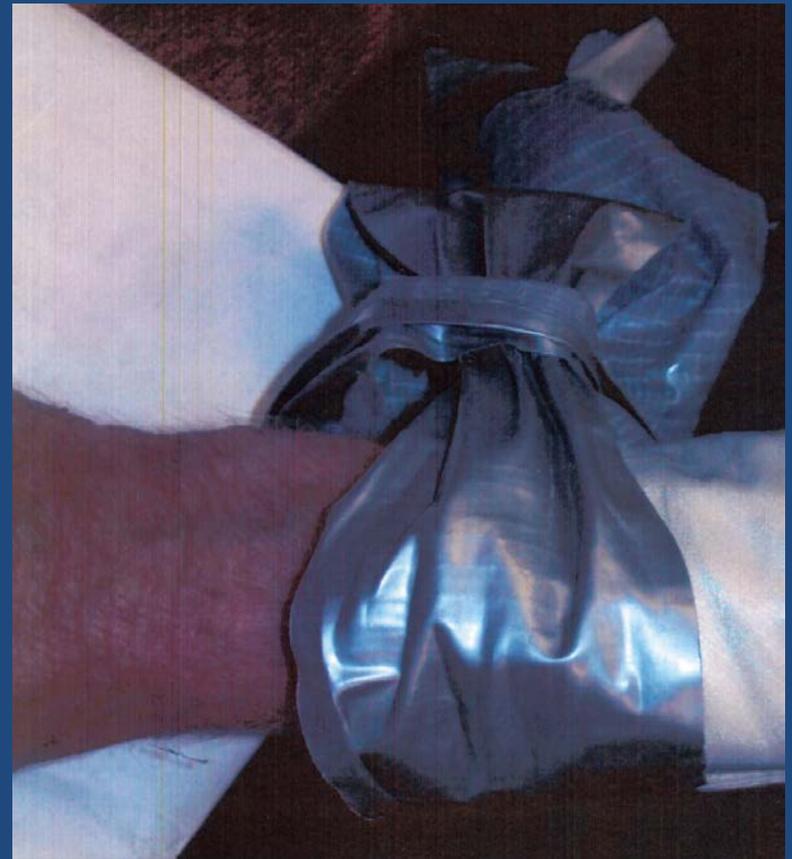
- A *physical and spectral* collection of duct tape and electrical tapes supplied by North American manufacturers or purchased by FBI personnel.
- Spectral data is collected within a platform known as SLICE (Spectral Library Identification and Classification Explorer)
- With sufficient features available, duct tapes can be sourced using this collection

Limitations of the NFTF

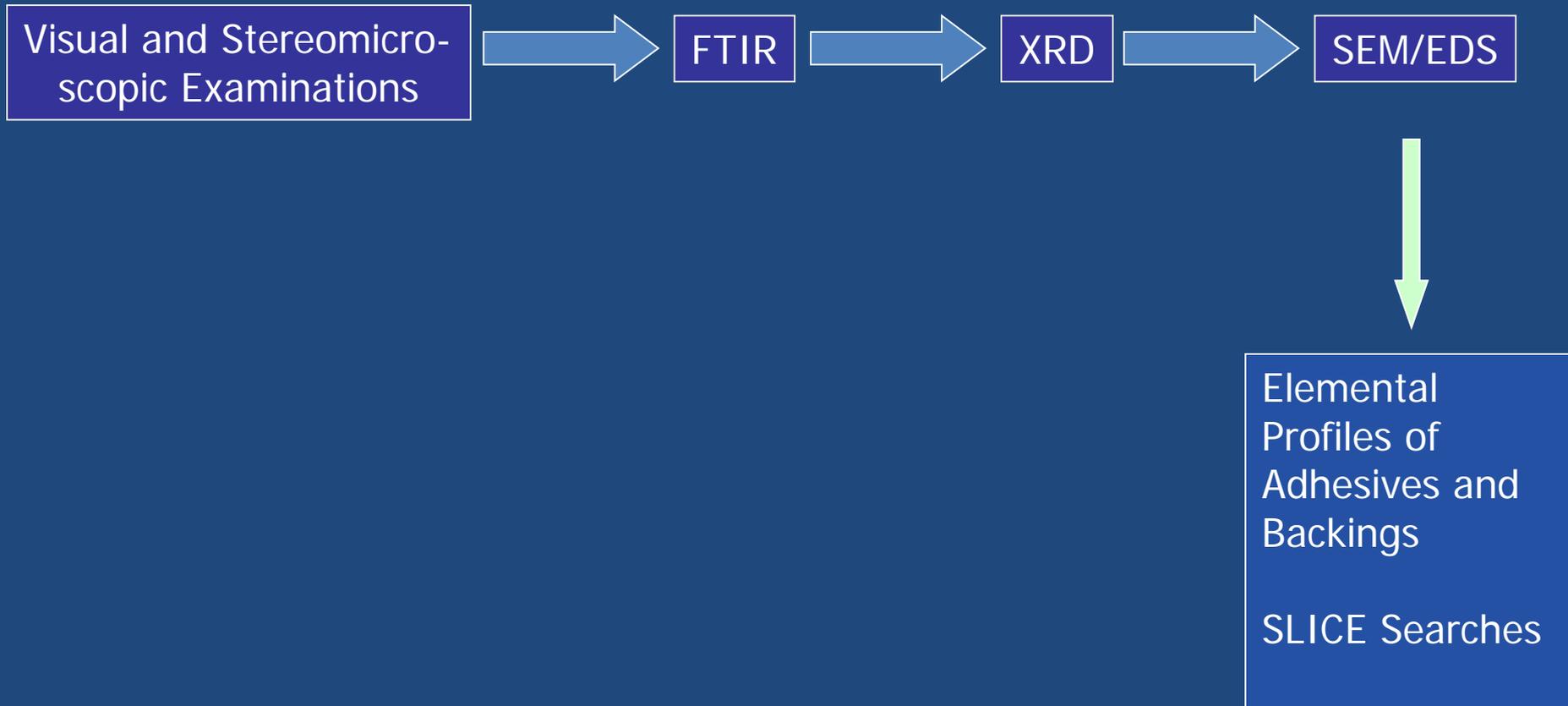
- Plant to consumer involves more steps/routes than with vehicles
- Not able to be *easily* shared across labs
 - Cooperative work with FDLE and MSHP
 - Currently, labs must have access to the SLICE platform to share the data

Duct Tape Case

- Cases involving duct tape evidence without a roll for comparison
- Request: Attempt to determine the manufacturer of the tape



Analytical Scheme



Duct Tape Collection

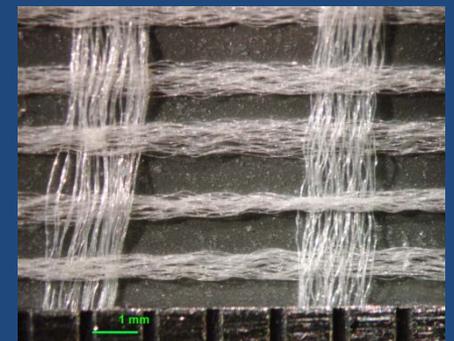
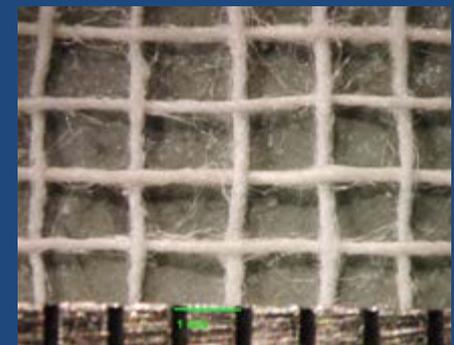
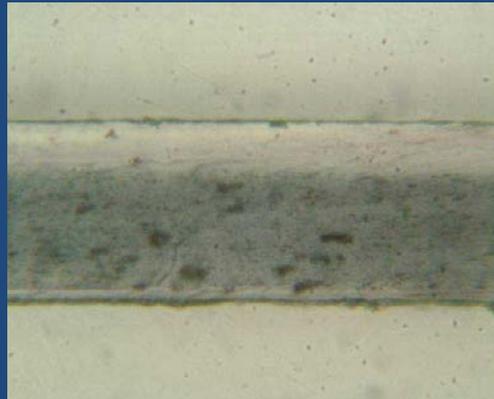
- 600+ tapes
- Most marketed as general-purpose or economy-grade
- Variety of manufacturers
- Collection updated as needed from manufacturer sources or through caseworking efforts



SLICE database

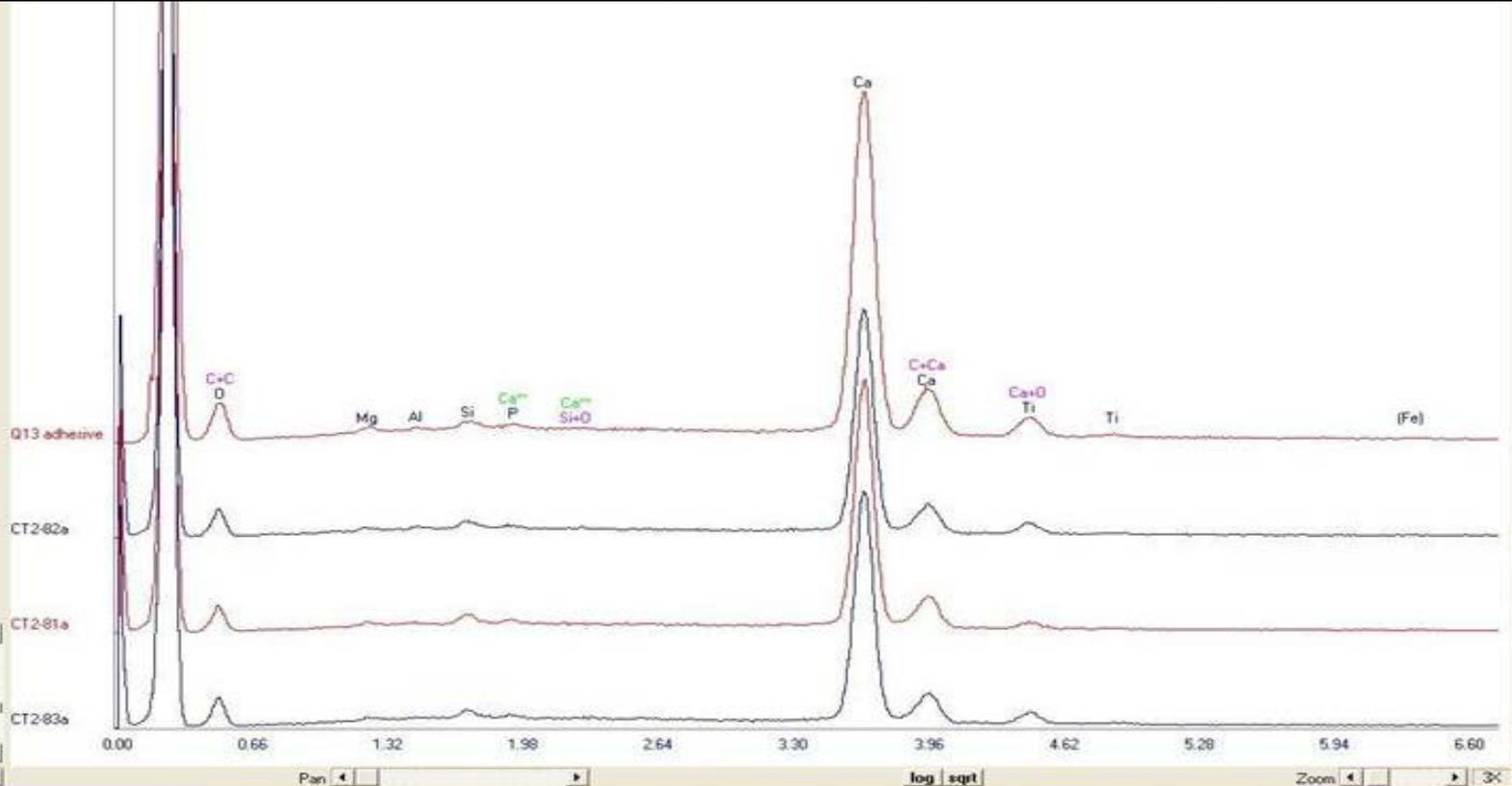
- Archival program for storing EDS data and text-based information
- Conventional format modified to allow for specific (physical) tape characteristics
- Populated initially via collaboration between FBI, FDLE, and MSHP

Duct Tape Features

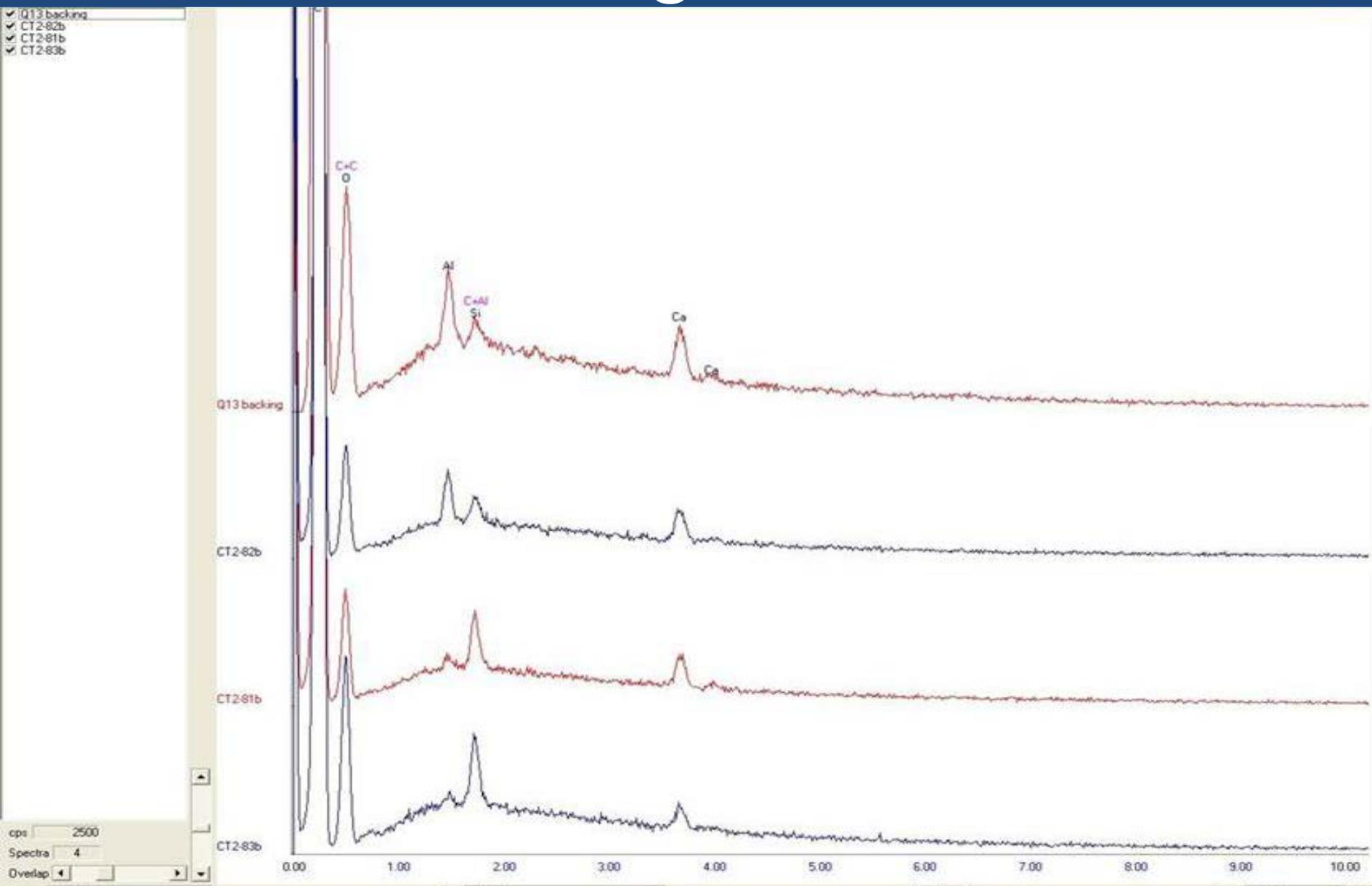


Adhesive search results

Sample	Manufacturer	Film type	Weave	Scrim Count	Fluorescence	Construction
Q13		smooth	plain	24/7	no	textured w/f
CT2-81	3M	smooth	plain	25/7	no	textured w/f
CT2-82	3M	smooth	plain	25/7	no	textured w/f
CT2-83	3M	smooth	plain	24/7	no </tr	



Backing search results



Unclassified

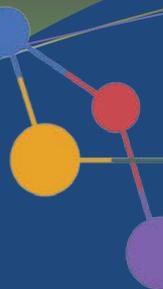
Duct Tape Case Results

- 3M Scotch[®] Home and Shop
- Also known as 3M[™] duct tape 3900
- General purpose tape manufactured by 3M in London, Ontario, Canada
- Unable to determine the distributor of the tape specimen
- Multiple retail outlets carry this product



Sharing FBI databases

- Need for and utility of the information still exists in FBI casework
- Dissemination to law enforcement agencies could be possible
- Partnering with other labs to populate these databases would be preferable
- NAPF and NFTF are population databases
 - Both rely heavily on physical features
 - *Might be* indicative of changing trends
 - More likely dictated by the realities of supply and demand



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