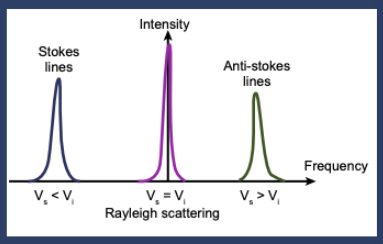
Universal detection of body fluid traces in situ with Raman hyperspectroscopy for forensic purposes: Evaluation of a new detection algorithm (HAMAND) using semen samples

Raman spectroscopy

- Advances in body fluid identification
- Challenge in substrate interference
- Analysis in situ affected
- Implementation in crime scene

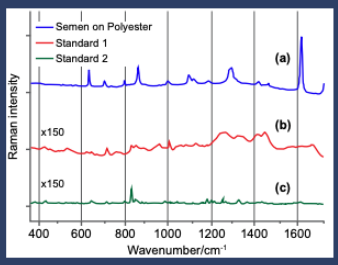


New approach

- Detection of body fluids
- Substrate independent
- Simulated semen evidence
- Extraction of fluid signal
- Automatic, non-destructive
- Matching with reference

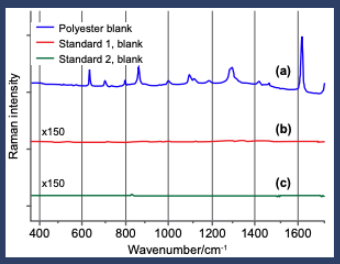
Raman spectroscopy is combined with numerical differentiation (HAMAND) and multivariate curve resolution for the detection and identification of biological stains on strongly interfering substrates

Breaking down semen spectrum into components



Fabric substrates suppresses organic Raman bands from semen

Algorithm preserves the selectivity of the Raman approach



Trace detection → **Advanced statistics** → **Spatial range**

Graphical Abstract Report

Job code: ABCD_3

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Target journal name: Journal of Raman Spectroscopy

Summary of specifications for the Graphical Abstract

Parameters	Specifications
Figure type	Combination
Height (mm)	126.26
Width (mm)	171
Resolution (dpi)	1200
File formats provided	PDF
Font type	Arial
Color Mode	RGB

Glossary of terms used in the report

RGB (Red, green, blue): A color mode, usually recommended for images intended for online publication

CMYK (Cyan, Magenta, Yellow, black): A color mode, usually recommended for images intended for print publication

TIFF (Tagged Image File Format): A file format, usually recommended for color and grayscale images, particularly photographs

EPS (Encapsulated PostScript): A file format, usually recommended for images, particularly for vector images such as graphs.

Line art: Images with straight lines and text, such as graphs, charts, and simple diagrams

Halftone: Photographic images, drawings, paintings, etc. with fine shading

Combination art: Images that are a combination of halftone and line art or halftone and text.