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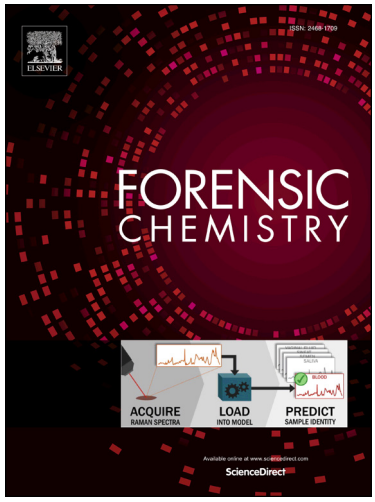

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Bloodstains, Paintings, and Drugs: Raman Spectroscopy Applications in Forensic Science

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Keywords: Raman spectroscopy, vibrational spectroscopy, forensic science, criminalistics, trace evidence, forensic chemistry

Abbreviations[1]

Technology Readiness Level: 1

Abstract

This review recounts recent developments in Raman Spectroscopy with regards to forensic science. Topics covered in this manuscript include: chemometrics, controlled substances, toxicology, counterfeit pharmaceuticals, explosives, gunshot residue, hair, fibers, paints, lipstick and nail polish, body fluids, forensic anthropology, and document examination.

[1] active pharmaceutical ingredient (API), ammonium nitrate fuel oil (ANFO), artificial neuron network (ANN), charge-coupled device (CCD), common component and specific weight analysis (CCSWA), deep-ultraviolet (DUV), direct analyte-probed nanoextraction (DAPNe), economically motivated adulterants (EMA), electron-multiplying charge-coupled device (EMCCD), Genetic Algorithm (GA), hexamethylene triperoxide diamine (HMTD), Improvised Explosive Device (IED), improvised incendiary device (IID), independent component analysis (ICA), Gunshot Residue (GSR), interval-PLSD (iPLSDA), k-nearest neighbors (kNN),label claim (LC),linear discriminant analysis (LDA),Mid infrared reflection (MIR), multi linear regression (MLR),multivariate curve resolution (MCR),Multivariate curve resolution-alternating least squares (MCR-ALS), near infrared (NIR), partial least squares regression (PLS), partial least squares-discriminant analysis (PLS-DA), pearson's product moment correlation coefficients (PPMC), polydimethylsiloxane (PDMS), portable Raman improvised explosives detector (PRIED), post mortem interval (PMI), principal components regression (PCR), Principle Component Analysis (PCA), prostate specific antigen (PSA), receiver operating characteristic (ROC), scanning election microcopy coupled with energy dispersive x-ray spectroscopy (SEM-EDS/X), single ultrafast pulse excited remote stimulated Raman scattering (SUPER-SRS), spatially offset Raman spectroscopy (SORS),Support vector machine (SVM), support vector machine discriminant analysis (SVM-DA), Surface enhanced Raman scattering/spectroscopy (SERS), Surface enhanced resonant Raman spectroscopy (SERRS), thermoplastic polyurethane (TPU), triacetone triperoxide (TATP), two-dimensional correlation spectroscopy (2D CoS)