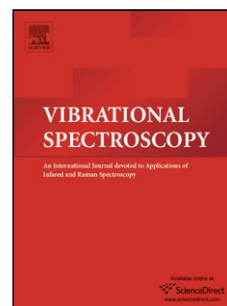


## Accepted Manuscript

Title: In-situ surface-enhanced Raman scattering and FT-Raman spectroscopy of black prints

Authors: Michal Oravec, Vlasta Sasinková, Katarína Tomanová, Lukáš Gál, Silvia Parciová, Christian W. Huck



PII: S0924-2031(17)30145-5  
DOI: <https://doi.org/10.1016/j.vibspec.2017.10.007>  
Reference: VIBSPE 2752

To appear in: *VIBSPE*

Received date: 18-5-2017  
Revised date: 29-9-2017  
Accepted date: 31-10-2017

Please cite this article as: Michal Oravec, Vlasta Sasinková, Katarína Tomanová, Lukáš Gál, Silvia Parciová, Christian W.Huck, In-situ surface-enhanced Raman scattering and FT-Raman spectroscopy of black prints, *Vibrational Spectroscopy* <https://doi.org/10.1016/j.vibspec.2017.10.007>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## In-situ surface-enhanced Raman scattering and FT-Raman spectroscopy of black prints

**Michal Oravec<sup>a</sup>, Vlasta Sasinková<sup>b</sup>, Katarína Tomanová<sup>a</sup>, Lukáš Gál<sup>a</sup>, Silvia Parciová<sup>a</sup>, Christian W. Huck<sup>c</sup>**

<sup>a</sup> *Slovak University of Technology in Bratislava, Faculty of Chemical and Food Technology, Radlinskeho 9, 812 37 Bratislava, Slovak Republic*

<sup>b</sup> *Slovak Academy of Sciences, Institute of Chemistry, Dubravská cesta 9, 845 38 Bratislava, Slovak Republic*

<sup>c</sup> *Leopold-Franzens University, Institute of Analytical Chemistry and Radiochemistry, CCB – Center for Chemistry and Biomedicine, Innrain 80/82, 6020 Innsbruck, Austria*

*[michal.oravec@stuba.sk](mailto:michal.oravec@stuba.sk), [Vlasta.Sasinkova@savba.sk](mailto:Vlasta.Sasinkova@savba.sk), [katarina\\_tomanova@stuba.sk](mailto:katarina_tomanova@stuba.sk),  
[lukas.gal@stuba.sk](mailto:lukas.gal@stuba.sk), [silvia.parciova@stuba.sk](mailto:silvia.parciova@stuba.sk), [Christian.W.Huck@uibk.ac.at](mailto:Christian.W.Huck@uibk.ac.at)*

### Abstract

The black inkjet and laser prints were analysed with regard to application in forensic analysis of questioned documents. The purpose of this work was to study spectral properties and compare the suitability of surface-enhanced Raman scattering (SERS) with Fourier transform Raman spectra of prints. This work aimed to find optimal surface-enhanced Raman spectroscopic approach for the future analysis of documents using statistical methods. In this work, we analysed eight prints of four laser and four inkjet devices. The samples were measured using two dispersive Raman devices; (DXR Raman microscope with excitation line 532 nm, Foram 685-2 spectrometer – 685 nm) and FT-Raman devices (Bruker Spectrometer MultiRAM with excitation line 1064 nm). The silver nanoparticles (AgNPs) colloid for SERS experiment were synthesised and checked by UV-Vis spectroscopy and scanning electron microscopy (SEM). The remarkable differences caused by centrifugation of silver colloid were observed just in the SEM images. The main contribution of this paper is to propose the novel approach achieving sufficient SERS signal intensity of black prints using the both, laser and inkjet printers. Moreover, this method is based on just a single metal colloid, and the analysis can be performed in-situ, i.e. directly on the printed sample surface. We consider the SERS could be highly promising and universal for applications in the forensic analysis of

Download English Version:

<https://daneshyari.com/en/article/7690950>

Download Persian Version:

<https://daneshyari.com/article/7690950>

[Daneshyari.com](https://daneshyari.com)