

## The use of micro-Raman spectroscopy as a fingerprint in a forensic investigation

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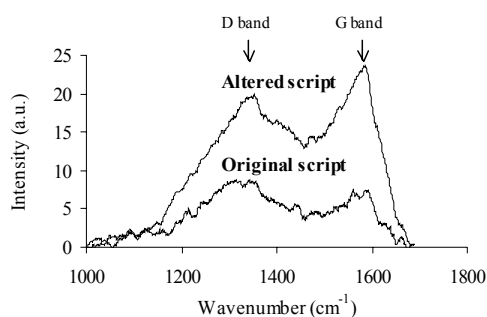
### Introduction

From the last years micro-Raman spectroscopy has revealed to be a powerful technique for the non-destructive physico-chemical characterisation of different materials related to the Forensic Science. A legal consulting in a cheque led to the investigation of the inks from the scripts using the micro-Raman spectroscopy. However there were no visible differences to the naked eye, the analysis were performed on different numbers and letters of the script.

### Results and conclusions

The spectra obtained (Fig. 1) reveal different Raman parameters ( $\nu$  and FWHM of the G and D bands; D/G intensity ratio) in the carbon component from the inks. This led us to the conclusion of the use of two different inks in the scripts (one used in the script 300 and another used in the number 1 of the 1300 euros).

Figure 1: The cheque investigated and the Raman spectra obtained in the original and altered script.



## A 270-year ice core record of atmospheric mercury deposition to western North America: An indicator of a partial success of the United States Clean Air Act of 1970

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The Upper Fremont Glacier (UFG), a mid-latitude glacier in the Wind River Range, Wyoming, U.S.A., contains a record of atmospheric mercury deposition. Although some polar ice-core studies have provided a limited record of past mercury deposition, polar cores are, at best, proxy indicators of historic mercury deposition in the mid-latitudes where 80 to 90 percent of the world's human population reside. Two ice cores removed from the UFG in 1991 and 1998 (each totaling 160 meters in length) provided a chronology and paleoenvironmental framework; essential to the interpretation of the mercury deposition record. A total of 97 ice core samples were selected using low-level processing methods and were analyzed to reconstruct a 270-year atmospheric mercury deposition record for the western United States.

The record shows that mercury concentrations are significantly elevated during periods corresponding to volcanic eruptions. This indicates that these natural events "punctuate" the record. Anthropogenic activities such as industrialization (global scale), gold mining and war-time manufacturing (regional scale), indicate that chronic levels of elevated mercury emissions have a greater influence on the historical atmospheric deposition record from the UFG. A declining trend in mercury concentrations is obvious during the past 20 years. This decline may be in response to the United States Clean Air Act of 1970.