

## Forensics applications of X-ray Fluorescence Microscope.

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The goal of this study was to investigate the utility of X-ray Fluorescence (XRF) microscope in determination of trace elements concentration and distribution in Gun Shot Residue, Antiques, Museum objects, and Counterfeit Products. The advent of XRF microscope for laboratory use presents new applications for the forensic scientists.

This presentation will impact the forensic community and/or humanity by providing practical insight into the application of XRF Microscope in analysis of Gun Shot Residue, Fingerprints, Museum and Archeological objects, and Counterfeit products.

Micro-XRF technology is a relatively recent introduction to the field of art conservation, archeology, boarder security, trace analysis and forensic science. XRF analysis gives a rapid, non-destructive reading of the elemental composition of any material for elements starting from Na till U in the periodic table. Horiba XGT-7000 XRF analytical microscope was used in this study. This desktop unit utilizes a portable 50W X-ray source for excitation, two switchable (as small as 10 microns) monocabillary for different special resolution, and capability to work in vacuum and in ambient condition.

We will show several examples of using micro XRF for:

- 1) Analysis of Gun Shot Residue (GSR). In addition to the chemical images, micro transmission images will be presented. Chemical images will be compared with Fluorescence images;
- 2) Fingerprints chemical images;
- 3) Chemical images of original and counterfeit devices;
- 4) Mapping of museum and archeological objects.