



B27 SEM-EDS Analysis and Discrimination of Forensic Soil

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This presentation will demonstrate how to analyze and discriminate forensic soil by using microscopic techniques.

Soils vary among different areas and have distinct characteristics due to natural effects and residues left by living beings over time. Because of the complex form and variations in compositions of soil between areas, several examination techniques and instruments for forensic soil analysis must be used. In examining soil evidences, building materials such as plaster, brick, etc., and dust must be considered in addition to ground soil.

In this study to discriminate the soil evidences, 108 soil samples were collected from 30 different locations in Istanbul and were analyzed by using stereo microscope and scanning electron microscope equipped with an energy dispersive X-ray spectrometer (SEM-EDS). All soil samples were prepared by using 0,5 mm sieve and then the samples were fixed to an adhesive tape placed on a stub (a sample holder of SEM). After the analysis with SEM/EDS, compositions of each sample were determined. The samples from the top of the sieves were examined with a stereomicroscope and natural and artificial materials with characteristic features were identified. Moreover, all soil samples were dried at 120°C and over 780°C. Their colors were compared.

The results of the analyses were appraised by using SPSS statistic program, and it was observed that these results can be used for forensic soil examinations. It has been determined that the examinations provided useful information for discrimination of soil evidences and supported the other analyses data.

Applications were also performed on evidence from crime scenes from Istanbul. In addition to routine analysis, the particles containing high atomic number elements were identified in the back scattered electron image of a scanning electron microscope and analyzed with an energy dispersive X-ray spectrometer. It was determined that this procedure could provide useful information to discriminate the soil evidence and determine whether they fit or not.

It was concluded that soil evidence can be used in forensic investigations and SEM-EDS is fast, reliable, and more accurate in even very small amounts of samples.

SEM-EDS, Forensic Soil, Stereomicroscope