



J8 Analysis of Black Toners Using Scanning Electron Microscopy (SEM)

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Learning Overview: After attending this presentation, attendees will understand some principles of printed matter examination and identification. The goal of this study was the estimation capabilities of the verification of toners on printouts made by using laser printing devices and laser multifunctional devices.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by proposing a novel method for the identification of laser printing. The proposed method could prove crucial for forensic casework and could run parallel to predominant document analysis methods. Hence, the present technique can be utilized for building a large database of various toner references for future considerations. The classification of the toner samples can be further studied using other analytical methods, such as Fourier Transform Infrared (FTIR) and Raman spectroscopy. These methods may help the forensic science community to characterize and classify the toners and present the data as additional information to the judicial system for the verdict.

The universal availability of printers and multifunctional devices has resulted in a decrease in handwritten documents. Since we currently have a choice of different types of printers, multifunctional devices, and copiers, the research to identify a printing device is a relevant problem.

To date, a few reports have indicated the possibilities of varying the available toners in Poland, based on studies by Infrared (IR) spectroscopy and Scanning Electron Microscopy (SEM). However, based on this study, it was not clear how to relate the toner to the appropriate device (printer, copier).

Therefore, the identification of printing and copying devices was performed within the framework of a research project by the Forensic Bureau of the Internal Security Agency. The goal of the study was to determine if a laser printer or multifunctional laser device could be identified by an examination of the toner on a printout from that device. The research materials used were printouts from ten different companies.

An analysis of the toners on printouts made from 134 models of laser printing devices was conducted. This analysis showed that the implementation of a more sensitive method such as SEM created new opportunities for the identification of laser printing. Group selection has been made and, in some cases, individual printouts. The present technique can be utilized for building a large database of various toner references for future consideration. However, the classification of the toner samples can be further studied by using other analytical methods such as FTIR and Raman spectroscopy. These methods may help the forensic science community to characterize and classify the toners and present the data as additional information to the judicial system for the verdict.

Toner, SEM, Analysis