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## Trace chemical investigation for forensic science using TOF-SIMS

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Time-of-Flight Secondary Ion Mass Spectrometry (TOF-SIMS) is well established surface technique which provides both elemental and molecular information from several monolayers of a sample surface while also allowing depth profiling or element mapping to be carried out. The use of TOF mass analyzer has improved the mass range, surface sensitivity, and mass resolution of SIMS. The static TOF-SIMS with these improved performances has expanded the application of SIMS to the study of a variety of organic, biological, and forensic materials. The TOF-SIMS analysis of Asian sealing-inks on paper surfaces were investigated. TOF-SIMS spectra were employed to identify elements and organic compounds in Asian sealing-inks. An analysis was performed on thirteen sealing-inks of red and purple color manufactured in Korea, Japan, and China. Overlapped area of sealing-ink, ball point pen, and laser toner in the document was also investigated to determine the order of recording. TOF-SIMS also provides a method of elemental and organic analysis that can distinguish between cosmetic samples of the same or nearly the same color. TOF-SIMS is a reliable, micro-destructive, and small area analyzing method for characterization of the elemental and organic composition of cosmetic smears. TOF-SIMS spectra and images were used to characterize different types of hair products and their results were compared with the conventional analysis. Therefore, a systematic study of various trace evidences via TOF-SIMS and other surface techniques can provide critical information in forensic laboratories for criminal cases.

### Biography

Yeonhee Lee is a researcher of Analytical Chemistry at Korea Institute of Science and Technology (KIST) since 1995. She has completed her PhD at University of Pittsburgh and a Post-doctorate at the Argonne National Laboratory. Her research interests are in surface modification and characterization of various materials. She is also investigating the applications of TOF-SIMS in the analysis of the archeological materials and forensic trace evidences. In Korean SIMS community, she currently serves as an organizing committee from 2002.

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