

ToF-SIMS discrimination of inkjet printer inks on paper using inorganic and organic mapping

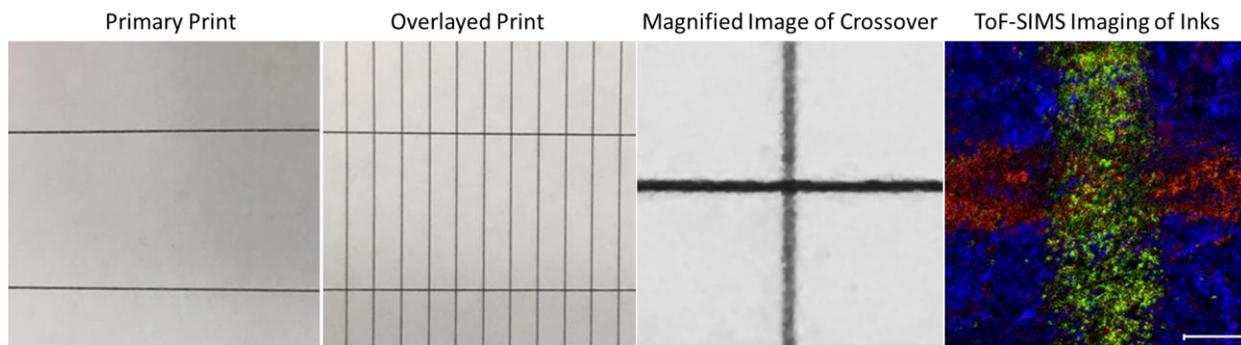
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The analysis of documents is an important aspect in forensic science to identify the authenticity of the said document. For example, examination of inks can be used to compare two or more ink sources on one or more documents to determine if they were written or prepared using the same equipment. The discrimination of the inks can be used to determine if texts were altered or if a document was prepared using "original" stationery.

Time-of-Flight Secondary Ion Mass Spectrometry (ToF-SIMS) is a powerful surface analysis technique which provides elemental and molecular information for the outermost 10-20Å of a sample surface. TOF-SIMS is a reliable small area analysis method for characterization of the elemental and organic composition of surfaces. ToF-SIMS has been previously shown to be suitable to identify and interrogate suspect markings by pencils, ballpoint pens and some dyes.

This work aims at demonstrating the capacity of ToF-SIMS to not only distinguish between different inks but determine the "original" parts of a suspect document compared to "modified" parts. ToF-SIMS was successfully applied to discriminate two sets of "black" ink from different inkjet printers. The results show that individual inks may be identified. As shown in the figure below, the area of overlap in a sample print was successfully used to determine the sequence of printing from two different printers. This is due to the extremely surface sensitive nature of the ToF-SIMS and the secondary print masking the primary print. The origin of CMY (coloured) prints and combinations of these can also be determined via this method.



Acknowledgements

This research uses the facilities of the Australian Microscopy & Microanalysis Research Facility (AMMRF) at the South Australian Regional Facility (SARF), University of South Australia, a facility that is funded by the University, and State and Federal Governments.