Application of Raman spectroscopy and infrared synchrotron radiation for digital print analysis

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Abstract

The chemical properties of ink, substrate and the interface between them influence the printing process and the achievable print quality. Several methods to characterize these properties have been developed and used in recent years. The usage of vibrational spectroscopy methods is opening a new way to characterize printouts at the molecular level. The Raman spectroscopy, mainly working with visible light and a low level of sample preparation, has a high potential in this field.

In the present work, the use of micro-Raman spectroscopy and synchrotron radiation-based infrared (SR-FTIR) spectro-microscopy offers a powerful, non-destructive method for the study and the identification of inks on paper and the comparison of them to one another without the need for chemical preparation and related laboratory work.

Using the proper measurement parameters, the 3-D distribution of ink in paper was studied and related to the spreading and penetration of single inkjet droplets. This research was undertaken at the IR beamline at the Australian Synchrotron, Victoria Australia.

Author Biography

Lutz Engisch received his diploma and PhD in surface chemistry and spectroscopy at Chemnitz University of Technology. Since April 2007, he has been working as a DFG postdoc fellow at the School of Physical und Chemical Science at the Queensland University of Technology in Brisbane, Australia in the group of Prof. P. Fredericks. His work focuses the combination of vibrational spectroscopy and digital fabrication by inkjet printing.

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