



Questioned Documents Section – 2006

J21 The Use of Hyperspectral Contrast Imaging for the Examination of Writing Inks

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Attendees will learn and understand some of the principles associated with evaluating the spectral and absorbance properties of inks by using a technique referred to as hyperspectral contrast imaging. HCI combines digital imaging and molecular spectroscopy for the analysis of various materials.

This presentation will impact the forensic community by providing validation of a new technique, which will prove to be extremely beneficial as a supplementary and complimentary examination to further characterize inks.

The examination of writing inks can be significantly important during criminal and civil investigations. Forensic ink analysis can be used to decipher obliterated entries, determine whether written notations were altered or inserted, ascertain if entries are authentic, and help link multiple documents. One important step in the examination process is to evaluate the inks non-destructively by utilizing filtered light, or a variation such as video spectral comparison. Occasionally, requests are made to conduct only non-destructive examinations on questioned documents (e.g. valuable documents), so a very powerful spectral technique may be warranted. Similar looking inks can have different compositions (e.g. colorants, volatiles, resins) that may affect their reflectance and absorbance properties. The benefit of examining writing inks using various illumination sources in combination with selected filters to aid in the discrimination of inks is well documented.

The authors in this study assessed the use of HCI by non-destructively examining black and blue ballpoint inks from 350 to 1700 nm using a Quartz-Tungsten Halogen light source. The spectral reflectance and luminescence characteristics of each were collected and cross-compared. The system that was utilized is capable of operating in the ultraviolet, visible and NIR regions for measuring fluorescence, reflected light, and luminescence through the use of liquid crystal tunable wavelength filters. The software allows for a high level of automated operation, data collection, and data processing.

Hyperspectral Contrast Imaging (HCI), Inks, Spectroscopy