J13 Analysis Techniques of Plastic Identity Documents

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After attending this presentation, attendees will gain a better understanding of new trends in plastic Identity Documents (IDs) and analysis methods by which to visualize and classify the materials used in their production.

This presentation will impact the forensic science community by: (1) increasing awareness of plastic IDs and of non-destructive/destructive analysis testing methodologies as a means of counterfeit deterrence and adversarial analysis; and, (2) identifying and highlighting tamper-resistant and copy-proof security features and printing incorporated within contemporary plastic IDs.

IDs are produced for and used by people around the world for a variety of different purposes, including proof of identity, employment eligibility, evidence of driving privileges, and domestic and international travel. IDs function as the link between an individual's government-verified biographical data (including, for example, date of birth, nationality, and sex) and the individual himself. These documents must be inherently secure and tamper evident to maintain public confidence and trust.

IDs can be manufactured in many different ways with a variety of types of plastic, including polycarbonate, Poly-Vinyl Chloride (PVC), Polyethylene Terephthalate (PET), or a combination of these and others. These plastics are combined with heat, pressure, and/or adhesives to create an overall card body that guards against tampering or alteration. In addition, security inks, Optically Variable Devices (OVDs), and Radio Frequency Identification (RFID) devices are incorporated within plastic documents as a deterrent against counterfeiting because they are difficult to replicate successfully. In addition, commercial availability of similar products and the knowledge of translating these products into counterfeit IDs are imperative for the manufacturer and designer to contemplate before placing a security feature into a document. Security printing is another important consideration in the manufacture of plastic identity cards; this includes personalization techniques such as laser engraving that discourage counterfeiters from replicating or compromising these methods.

Sophisticated non-destructive and destructive techniques that may be utilized to determine whether or not an ID is genuine will be explored. Non-destructive techniques include digital microscopy, which may be used to: (1) visualize plastic identity cards' security features from a 3D, depth-up perspective; (2) measure the relative heights of these features; and, (3) even classify the internal card body structure. Fourier Transform Infrared Spectroscopy (FTIS) is another non-destructive technique that allows the chemical composition of a variety of plastic substrates to be elucidated quickly and efficiently. A destructive technique that has been utilized at the laboratory in counterfeit deterrence analysis is card cross sectioning, which is achieved by cutting the card at a predetermined point of interest, mounting the card in an epoxy-resin mixture, polishing, and analyzing it with the Scanning Electron Microscope (SEM). Elemental techniques such as Energy-Dispersive X-Ray Spectroscopy (EDS) may then be employed to probe specific areas within the card body, such as the RFID, to ascertain an accurate elemental composition that was used in the card body construction.

Plastic, Identity Documents, Counterfeit Deterrence

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