UNIVERSITY OF LEICESTER

Enhanced detection of latent fingerprints

Investment opportunity for companies supplying forensic or electrical equipment

- **Effective**
- **Versatile**
- **Practical**

Challenge

- Currently, forensically useable fingerprints are only recovered from 10% of evidential metal objects, weapons, jewellery, tools or handles, because traditional methods are not very effective in developing prints of unknown history, that may be degraded over time or due to the environment
- It is difficult to visualise fingerprints deposited on dark or multicoloured backgrounds
- Visualising fingerprints on metal surfaces is particularly challenging
- A significant number of prints cannot be used due to poor quality and poor visualisation with powders

Solution

Using its expertise in forensic sciences, the University of Leicester has developed a method of developing fingerprints that is:

- **Superior:** enhanced detection, compared to current methods, of low-grade fingerprints on metal surfaces
- **Effective:** increase in forensically useable fingerprints independent of print history
- **Versatile:** a single reagent gives a choice of colours (yellow, green, blue) to provide maximum contrast between fingerprint deposit and surface
- **Practical:** simple, cheap and safe to perform

Image: Fingerprint on a knife

Colour – a new dimension in latent fingerprint enhancement on metals

Image 1

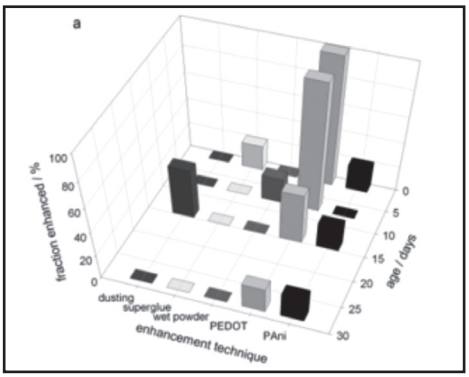

Image 2

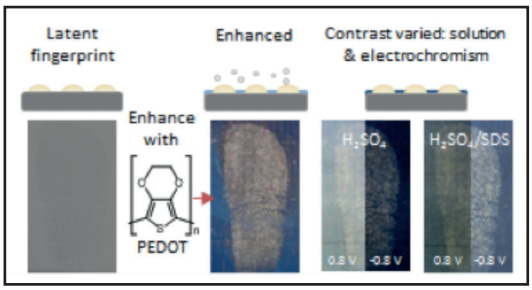

Image 3

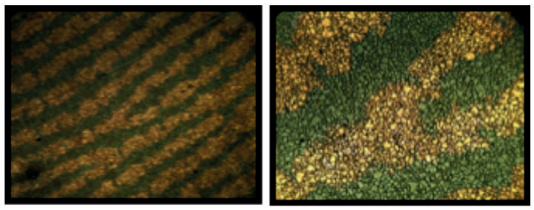

Image 4

Metallic objects – in the form of weapons (knives, guns, bullet casings), tools or intrinsically valuable items – are frequently involved in crimes of violence or serious theft. Prior to recovery; exposure to water, heat or other environmental factors may result in loss or erosion of fingerprint deposits to the point where conventional enhancement processes or reagents are ineffective. The University of Leicester has developed a novel technology for overcoming these limitations using electrochromic materials. The process (image 3) exploits the fingerprint deposit as a "mask" through which a coloured polymer is electrodeposited to generate a negative image of the fingerprint with high visual contrast. This is accomplished using a purpose-designed cell (image 1), containing the reagent solution, the object and other electrodes to control the applied voltage.

Since the polymer is deposited between the ridge deposits, it offers the prospect of use with techniques that involve interaction with the fingerprint deposits, such as powders and cyanoacrylate. The polymers chosen are electrochromic: after transfer of the object to a reagent-free electrolyte solution, varied application of low voltages (<1V) allows the colour of the polymer to be manipulated, providing an additional contrast control parameter. Microscopic observation (image 4) shows sharp definition.

The treated surfaces are durable: the polymer is adherent, chemically stable and retains its optical properties under ambient storage conditions for periods in excess of a year. The chemistry requires the presence of minimal amounts of fingerprint residue to fulfil this templating role. This permits visualization of marks exposed to water for extended periods or deliberately washed with soap solution, for which performance is competitive with commonly used techniques (image 2).

This project was funded by EMDA/ERDF

Benefits

- Enhanced, history-resilient, detection of latent fingerprints deposited on metals of any colour, resulting in a remarkable increase in the recovery of forensically useable prints
- Our novel technology involves the electropolymerisation of a monomer onto a conducting surface
- The enhanced performance and versatility of our technology present a strong case for it to be the **method of first choice** for the processing of metal objects (particularly of uncertain history) from crime scenes in the near future
- In contrast to powders or superglue, minimal residue is required to "mask" the surface and achieve visualisation of a fingerprint. Uniquely the polymer colour can then be changed by varying the potential, allowing maximum contrast between the print and surface to be achieved

Market

This technology would replace a significant part of the use of forensic powders, the market for which is $1 billion worldwide.

IP status

Patent applications have been filed in the UK and Europe.

Are you a company supplying forensic or electrical equipment looking for an investment opportunity? Contact us to find out more:

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