

## The Development of Latent Fingerprints on Polymer Banknotes<sup>8</sup>

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### ABSTRACT

Polymer (plastic) banknotes have completely replaced traditional paper banknotes in Australia and New Zealand and are also in use in Bangladesh, Brazil, Brunei, Indonesia, Kuwait, Malaysia, Papua New Guinea, Romania, Singapore, Sri Lanka, Taiwan, Thailand and Western Samoa. The notes (produced by Note Printing Australia) are a polypropylene (PP) film covered with an opacifier, printing, and a protective overcoat. Areas left without any treatment over the PP film create clear windows. Polymer banknotes are a difficult surface for latent print development as routine techniques used on non-porous surfaces, such as cyanoacrylate fuming, have limited effectiveness. Collaborative research between UTS and the AFP has resulted in a procedure that successfully develops latent prints on this difficult surface.

Firstly the notes are treated with cyanoacrylate fuming. This minimises degradation of any prints and makes the surface more suitable for further treatment. Notes must be treated as soon as possible as prints degrade quickly due to the semi-porous nature of the surface. Any prints that develop on the clear windows should be stained and photographed as they may be damaged by further treatment, which has been optimised for the general note rather than the clear windows.

The notes are next treated with Vacuum Metal Deposition (VMD). VMD involves the evaporation and deposition, under vacuum, of a thin layer of gold and then zinc. The zinc layer will not form on contamination, such as fingerprints, hence any prints on the surface are revealed. The main advantages of VMD are that it is very sensitive and so able to detect the small amount of residue present on the note and that it removes interference from the printing. No treatment other than cyanoacrylate fuming and staining of the window should be applied to the banknotes before VMD. Other techniques will not effectively develop prints and will have a detrimental effect on the VMD development.

The notes are finally treated with a luminescent stain to increase the contrast between the prints and background and so the sensitivity of the procedure. Care must be taken during this process not to damage the zinc layer formed by VMD.

The optimised sequence of treatments has been successfully applied to 6-month-old prints on unused banknotes and also to actual casework. The possibility of good print development decreases as the notes are used as the use of banknotes results in surface damage of the notes.

### KEYWORDS

Latent fingerprint development, Polymer Banknotes, Cyanoacrylate Fuming, Vacuum Metal Deposition

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<sup>8</sup> Format 90x120 cm