Review Article

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Development of Fingerpints using an Alternative and Reliable Methods

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Abstract

The development of the forensic science field is achieving greater heights, bringing out the easiest, secured and most effective methods to solve the case as early as possible. As we handle a lot of issues related to the types of evidences and their importance in the field, we need such kind of powerful and concrete type of evidence on which investigation officer can rely. Fingerprints are one such kind which holds importance. There are various types of methods to develop different kinds of fingerprints (latent, patent, plastic prints) . "SUPER GLUE" (cyanoacrylate ester) is one of the best methods to develop the fingerprints. One procedure uses Gentian Violet and is particularly suited to clear polythene. The other is a fluorescent method, using a laser dye Coumarin 540/480 and is particularly suited to reflective surfaces such as aluminium foil and chrome.

Keywords: Fingerpints using; Alternative and reliable methods.

Two simple staining methods which improve the contrast and ridge detail of fingerprints developed with "Super Glue" (cyanoacrylate ester): The use of cyanoacrylate ester vapour (Super Glue) has become a popular and reliable technique for the development of latent fingerprints. This paper states two staining procedures for improving the contrast of weak Super Glue fingerprints based on the selective absorption of the stain by the polymerised Super Glue. One of the methods uses Gentian Violet and is specifically suited to clear polythene. The other is a fluorescent method using a laser dye Coumarin 540 and is specifically suited to reflective surfaces such as aluminium foil and chrome.[1] (Fig. 4)

Fingerprint detection: current capabilities: The detection and identification of latent fingerprints remains one of the best forensic techniques for the investigation of crime. The value of fingerprint evidence for a particular investigation relies on the ability of the fingerprint technician to detect, enhance, and record the latent fingerprint, that are left behind when a smooth surface is handled with the bare hands. There is a wide range of optical, physical, and chemical detection techniques available, which can be employed to detect and enhance fingerprints on various types of surfaces. The purpose of this article is to provide an overview of the common fingerprint detection methods that are employed in routine casework. The information provided includes the general principle behind each technique, how the technique is applied, and how methods can be employed in sequence to maximise detection effectiveness.[2]

Study for the use of coumarin-480 to enhance the fingerprints: A new alternative and effective super glue post-treatment method for the enhancement of fingerprint, over two different non-porous surfaces including glass slides and high density polyethylene (HDPE) sheets, have been investigated. This is the first documented application of 2, 3, 6, 7-tetrahydro-9- methyl-1H,5H-quinolizino (9,1-gh)

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coumarin or coumarin-480 for the enhancement of cyanoacrylate fumed fingerprints. Coumarin-480 in ethanol is used as cyanoacrylate post-treatment dye. Fingerprints of different donors are aged for three different time periods (1 day, 1 week and 4 weeks) over non-fluorescent glass slides and HDPE sheets and developed with cyanoacrylate fumes. Upon staining with coumarin-480, finger marks of varying qualities can be observed under long UV radiations. Rhodamine 6G can used to assess the relative sensitivity of the coumarin-480 for the enhancement cyanoacrylate developed fingerprints. Pseudo-operational trials can be conducted on glass bottles and high density polyethylene shopping bags. Coumarin-480 produced superior enhancement on HDPE shopping bags and glass bottles than the rhodamine 6G.[3]

A Mechanistic Model for the Superglue Fuming of Latent Fingerprints: The use of superglue vapours to detect latent fingerprints is known as superglue fuming. The role of the fingerprint material in the process, leading to formation of methyl cyanoacrylate polymer at the site of the fingerprint, remains to be established. Films of liquid alkanes respond similarly to actual fingerprints in the fuming experiment. Their responses depend on the hydrocarbon used, viscosity, and film thickness. Factors such as film thickness appear to be relevant for actual fingerprints as well. (Fig. 2) A model was proposed in light of these observations. The model compares the process with gas chromatography, in which molecules partition between the gas phase and a stationary phase.(Fig. 1 and 3) Aspects such as accumulation of superglue monomers by partitioning into a thin film (or wax) are consistent with the preferential response of fingerprints on surfaces relative to the background.[4]

Fig. 1: Superglue Fuming Chamber.

Fig. 2: Developed Latent Fingerprints.

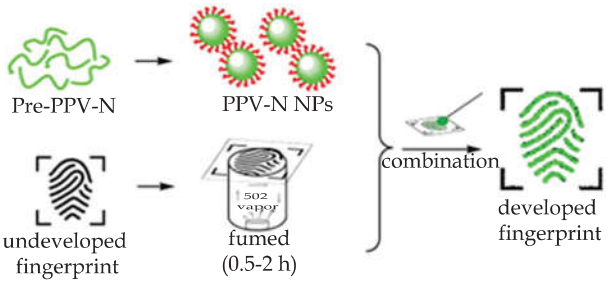

Fig. 3: Process of Super Glue Fuming.

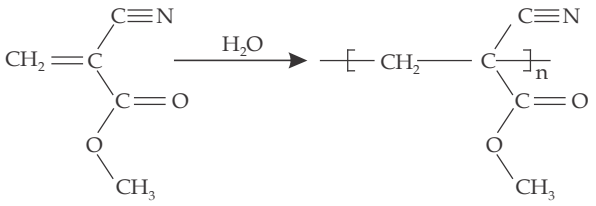

Fig. 4: Polymerization of Ethyl Cyanoacrylate in the Oresence of Water (Weak Base).

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