TECHNICAL NOTE

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ANS (8-Anilinonaphthalene-1-Sulfonate)—A New Reagent for Detection of Latent Fingerprints

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ABSTRACT: ANS (8-anilinonaphthalene-1-sulfonate) has shown itself to be a valuable and sensitive reagent method for the detection of latent and greasy prints on porous surfaces. The working solution is sprayed onto the porous surface where latent or greasy prints are suspected and the prints show bright yellow fluorescence against dark background under ultraviolet (UV) lamp (long wavelength) illumination. The advantages of this method are its rapid reaction, no heat needed, high sensitivity, no unpleasant odor, simplicity, and convenience in processing.

KEYWORDS: criminalistics, fingerprints, 8-anilinonaphthalene-1-sulfonate (ANS), ultraviolet lamp

Ninhydrin is the most commonly used reagent for the visualization of latent fingerprints on porous surfaces. Other sensitive reagents have been developed over the past several years such as ortho-phthalaldehyde (OPA) [*1,2*], fluorescamine [*2,3*], dansyl chloride [*4*], dimethylacetamide (DMAC) [*5*], and so forth; also, laser-aided detection or enhancement of latent fingerprints [*6-12*] has been simultaneously used.

In this article, the author describes the use of a new reagent, 8-anilinonaphthalene-1-sulfonate (ANS), for the visualization of latent or greasy fingerprints. The mechanism for its reaction is that ANS [*13*] will be bound to the apolar regions of proteins, phospholipids, sterols, hydrocarbonates, and probably other apolar moleculars. My experiments demonstrate that it is most suitable for greasy contaminations of fingerprints.

The advantages of this reagent include: low cost, no heat required, reaction speed, sensitivity, and no unpleasant odor. In addition to these, the solvent system is chosen for its minimal ink running on documents.

Experimental Procedure

Reagents

ANS, methanol, freon (trichlorotrifluorethane), and molecular sieves 3A can be purchased from Merck Chemical Co. In 5 mL of methanol 1 g of ANS is dissolved, then the

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solution is mixed with 200 mL of freon; two layers are formed 1 min later, and molecular sieves 3A are added to remove the layer of methanol which easily causes ink running on documents.

Development of Fingerprints

ANS reagent is prepared as previously described. The documents containing latent or greasy prints were sprayed with this solution, allowed to dry 1 min, and visualized under a long wavelength ultraviolet (UV) lamp (Police Science Industry, Ltd., Tokyo, Japan).

Results and Discussion

Fingerprint residue or greasy prints react with ANS to produce bright yellow fluorescence, thus, this method is most suitable for dark background porous surfaces. As shown in Fig. 1, the ridge detail can be clearly resolved.

Note that for many surfaces in my experiments, parts of them also give background fluorescence to some extent. Hence, the author suggests the prior test of an unimportant border of the evidence surface or a separate test of the same material be conducted to control the background interference.

Many solvent systems have been tried. The freon system has been chosen for its nontoxic, noninflammable, minimal effect on inks, low boiling point, and almost no background coloration problems [*14*]. However, ANS cannot be dissolved in freon, therefore, the ANS must be dissolved in a suitable solvent (methanol) before mixing with freon. After mixing and standing to form two layers of solution, molecular sieves 3A are used to absorb the methanol, and the freon solution can be sprayed for reaction.

FIG. 1—*Greasy fingerprint fluorescence under UV light after simple spray treatment (photographed with Kodacolor film, ISO 100, exposure time 3 s at f-stop 22).*

Conclusion

The speed, simplicity, lack of needed heat, lack of offensive odor, and high sensitivity achieved by the use of ANS to visualize latent and greasy fingerprints on porous materials are encouraging. Further work on this method should establish: the possibility for cross-examination with ninhydrin/zinc chloride following argon ion laser excitation and the optimal sequence of these two methods, the effect of argon laser equipped with an UV device for enhancement of prints, and the effect of age of the fingerprints on various surfaces.

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