Presentation title:

Aggregates of 1,8-diazafluoren-9-one - a non-toxic method for the detection of fingerprints on standard and thermal papers

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Fingerprints are unique, unchangeable, and indelible. This information has become the basis for the widespread use of latent prints for personal identification. Particularly problematic substrates on which dactyloscopy traces are secured are absorbent substrates characterized by a porous structure into which components of the sweat-fat substance are absorbed. Methods that interact chemically and physically with the elements contained in the prints are most commonly used to reveal such traces. Currently, some of the methods used to visualize dactyloscopy traces on porous surfaces are based on the creation of toxic solutions containing the molecule DFO (1,8-diazafluoren-9-one), which combines with a-amino acids from the sweat-fat substance to produce a colored reaction product. An attempt has been made to modify the procedures and new solutions have been proposed, whose environment is non-toxic and whose action is dedicated to paper substrates and thermal papers. Thermal paper is composed of many layers, one of which is a group of heat-sensitive dyes that, under the influence of solvents, become activated blackening the surface of the paper, making it impossible to observe and analyze the traces revealed. Studies on the solution were preceded by spectroscopic analyses. The proposed innovative procedure prevents this phenomenon, a protective layer is formed on the surface of the paper and at the same time stabilizes the solution for revealing fingerprint traces. In the proposed environment, the phenomenon of aggregation of DFO molecules, in the presence of the remaining molecules of the working solution, combined with the fingerprint trace effectively reveals it, both on the surface of the classical paper and the problematic thermal paper. This research was supported by a grant National Science Centre 2021/41/B/HS5/03250 (K.W.,M.K., A.L., M.Ch., M.Cz., E.G.)