

New physicochemical methods of revealing fingerprint traces, as a forensic science tool to increase the effectiveness of crime detection in a criminal process.

In the modern world, development trends do not only concern technical or scientific achievements. The criminals themselves and the methods they use also evolve, which often translates into real difficulties in detection work. Therefore, it is assumed that the reaction of law enforcement agencies should be adequate to the crimes committed and the methods of committing them. It is therefore of the utmost importance that the technical and tactical methods of detecting crimes are continuously improved. In this process, an important role is played by forensics - legal science of an interdisciplinary nature, the functioning of which is closely related to the needs of the criminal process for scientific methods of detecting crimes and criminals themselves. It is important that the actions taken by it (based on the developed techniques) are effective and purposeful. These activities consist in developing appropriate tools thanks to which competent institutions and instances can effectively and objectively find the truth.

The main goal of the project is to introduce an innovative, physicochemical method of revealing forensic fingerprint traces, which will significantly contribute to increasing the effectiveness of fingerprint identification, and thus - improving the effectiveness of actions taken by law enforcement agencies. Police practice shows that fingerprint traces, which enable the identification of a person, are the most common traces left at the scene of a crime. Forensics has various methods of revealing and securing fingerprint traces (which is directly related to their diversity). They must guarantee effectiveness, credibility, reliability and safety. Currently, not all of the methods used meet these criteria, which translates into lower effectiveness of law enforcement agencies. This means that forensics cannot be based only on known methods of revealing and securing traces - in order to effectively achieve the goals of the criminal process, it is necessary to develop modern and effective methods that will guarantee their better implementation. Analytical and dogmatic research conducted as part of the project will primarily determine the degree of dependence between the need to modernize the methods of revealing fingerprint traces and the implementation of the forensic evidence function, which is related to the collection of evidence in criminal proceedings. They also take into account the analysis and evaluation of currently used physicochemical methods and reveal dactyloscopic traces. Research on the development and modernization of physicochemical methods of trace visualization are aimed at introducing a new research method into dactyloscopic practice. It will allow the description and evaluation of the photophysical and structural properties of the originally designed luminescent materials and innovative procedures for forensic detection and disclosure of fingerprints. In particular, a luminescent probe, such as 1,8-diazafuor-9-one, incorporated in various solvents and in a solid or polymer matrix (thin films) will allow the development of new approaches in dactyloscopy. It should also be emphasized that the physicochemical methods of revealing fingerprints provide great opportunities for the identification of fingerprints. They work well in cases where the so-called traditional methods are not effective - they do not make it possible to visualize the trace to secure the evidence.

A thorough analysis of the regulations in the field of forensics and criminal procedural law will allow to assess the scientific value of the new method in terms of the law of evidence. The results of the conducted research will lead to the formulation of the optimal scope of application/use of a new physicochemical method of revealing dactyloscopic traces. This applies to both the broadly understood forensic technique and the introduction of a new method to the catalog of methods of revealing fingerprint traces, as well as an additional tool used in criminal proceedings to increase its effectiveness. Forensics is the scientific backbone of the activities of law enforcement agencies and the judiciary, therefore the areas of its investigation must be consistent with the needs of forensic practice, and the technical level of solutions must match the current scientific and technical progress.