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THE HARNESSING OF CIANOACRYLATE METHOD OF DETECTING LATENT HANDPRINTS USING A VACUUM CHAMBER

The article highlights the mechanism of reaction between the esters of cyanoacrylic acid with amino acids and water contained in sweat and adipose substance.

Examples of the suitability of the cyanoacrylate method for the detection of hand marks on different types of surfaces under study are given. It is noted that the proposed method is most suitable for the identification of hand marks on surfaces such as polyethylene films, cellophane, various types of metals and alloys, plastics, glossy dense cardboard, glossy and copying paper, smooth leather substitute. Attention is drawn to the fact that the method is not suitable for detecting traces on porous surfaces (paper, unpainted cardboard, wood, the like). It is emphasized that after detection of traces of cyanoacrylate, it becomes impossible to conduct biomedical studies of the sweat and adipose.

The advantages and disadvantages of the cyanoacrylate method are analyzed, and the methods of its application with the help of cyanoacrylate chambers (atmospheric type and vacuum) and gas burners are given. The peculiarities of chamber design (atmospheric type and vacuum) are considered, comparative analysis is carried out, advantages and disadvantages of their use are shown, in particular, due to their design.

Design and principle of functioning of the prototype of cyanoacrylate and vacuum chamber for detection of latent handprints developed by the State Research Institute of the Ministry of Internal Affairs of Ukraine in cooperation with Shostak

V. V. on request of the State Research and Expert and Criminalistic Centre of the Ministry of Internal Affairs of Ukraine within the framework of the research and development work “Development and production of the prototype of the vacuum chamber for detection of latent handprints by cyanoacrylate method”, cipher “Vacuum” are considered.

Highlighted the advantages of the developed prototype, in particular: the absence of overexposure of traces due to the exclusion from the process of polymerization of the “background” catalyst due to atmospheric moisture; uniform manifestation of handprints on long objects regardless of their position inside the working chamber due to the uniform distribution of cyanoacrylate vapor throughout the working volume and effective detection of traces, even on tightly adjoining surfaces.

The necessity of equipping the forensic units of the Ministry of Internal Affairs of Ukraine with cyanoacrylate cameras and introduction of cyanoacrylate method to expand the possibility of detecting latent handprints and create conditions for increasing the efficiency of work of forensic experts.

Keywords: cyanoacrylate method, cyanoacrylate chamber, cyanoacrylates, latent traces, sweat and adipose substance.

REFERENCES

1. Metodicheskiye ukazaniya po ispolzovaniyu tsyanakrylatov v ekspertnoy praktike vyyavleniya sledov ruk. “Guidelines for the use of cyanoacrylates in expert handprinting practices”. URL: <http://eko-czao.narod.ru/> (date of application: 02.10.2019) [in Russian].

2. Metodyka daktyloskopichnoi ekspertyzy. Ekspertna spetsialnist 4.6 «daktyloskopichni doslidzennia». “Dactyloscopic examination technique. Expert specialty 4.6 "Dactyloscopic examination"” / composition: Zholtanska I.I., Kuznetsov V.A., Shchhavelev A. V., Dimitrova Yu. V., Kushnirenko N. V. Kyiv: SRECC of the Ministry of Internal Affairs of Ukraine, 2014. 119 p. [in Ukrainian].

3. *Vernyhorova V.N., Sadenko S.M.* Klei i skleivaniye. “Glues and bonding”. URL: // <http://library.pguas.ru/xmlui/bitstream/handle/123456789/1071/%D0%BA%D0%BB%D0%B5%D0%B8.pdf?Sequence=1&isAllowed=y> (date of application: 02.10.2019) [in Russian].

4. *Nadyeznaya adgeziya s pomoshchiu tsianakrilata.* “Reliable adhesion with cyanoacrylate”. URL: // <http://helvetica-online.ru/nadejnaya-adgeziya> (date of application: 04.10.2019) [in Russian].

5. *Prinstypy polimerizatsii kleyashchikh veshchestv.* “The principles of polymerization of adhesives”. URL: // http://germeticus.ru/questions/index/km/glue_polymerization/ (date of application: 04.10.2019) [in Russian].

6. *Poliakrilimidoobrazuiushchiye sopolimery s nizkoi temperaturoi imidizatsii i materialy biomeditsynskogo primeneniya na ikh osnove.* “Polyacrylimide-forming copolymers with a low imidization temperature and materials based on biomedical applications”. URL: // <https://diss.muotr.ru/author/5/> (date of application: 07.10.2019) [in Russian].

7. *Kornoukhov V.Ye., Yaroslav Yu.Yu., Yakovenko T.V.* (2011). Daktyloskopicheskaya ekspertiza: sovremennoye sostoyaniye i peraspektivy razvitiya. “Fingerprint examination: current status and development prospects”. M. 320 p. [in Russian].

8. *Byvalina O.O.* (2018). Vykorystannia tsianoakrylovoi kysloty pid chas vyjavlennia slidiv dfaktyloskopichnoho pokhodzhennia v laboratornykh umovakh. “The use of cyanoacrylic acid esters in the detection of traces of dactyloscopic origin in laboratory conditions” // Actual problems of forensics and forensic examination: Proceedings of the Interagency Scientific Conference. Kyiv. P. 53–56. [in Ukrainian].

9. *Sovremennye sredstva vyjavleniya sledov ruk.* “Modern means of detecting hand marks”. URL: // <http://www.krim-market.ru/downloads/sirchiepdf.pdf> (date of application: 10.10.2019) [in Russian].

10. *Anistratenko V.V., Kuznietsov V.A., Shchaveliov A.V. and others.* (2006). Svitovyi dosvid vykorystannia efiriv tsianoakrylovoi kysloty v kryminalistytsi: metodychnui lyst. "World experience of using cyanoacrylic acid esters in forensics: a methodological letter". Kyiv: SRECC of the Ministry of Internal Affairs of Ukraine. 11 p. [in Ukrainian].