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Research on Efficiently Finding Traces of Biological Material Evidence in Crime Scene Investigation

Sn. Engr., Dr. Daiqin Tao, Ph.D. ^{a, b, c, *}, **Sn. Engr. Junjun Li** ^{a, b, c}, **Sn. Engr. Ye Yuan** ^{a, b, c},
Sn. Engr. Yongjie He ^{a, b, c}, **Engr., Dr. Jing Ding, Ph.D.** ^{a, b, c}, **Sn. Engr., Dr. Tao Liu, Ph.D.** ^{a, b, c, *}

^a Chongqing Institutes of Higher Education Key Forensic Science Laboratory (Southwest University of Political Science and Law), Chongqing 401120, China;

^b Chongqing Municipal Key Laboratory of Forensic Evidence Technology (Chongqing Public Security Bureau), Chongqing 400707, China;

^c Chongqing Engineering Research Center for Criminal Investigation Technology, Institute of Forensic Science, Chongqing Public Security Bureau, Chongqing 400021, China.

* CORRESPONDING AUTHORS. Daiqin Tao (E-mail: taodaiqin@hotmail.com); Tao Liu (E-mail: nkliutao@foxmail.com).

ABSTRACT This is the preface of a special study about *Research on Efficient Discovery of Biological Evidence Traces in Crime Scene Investigation*. **Sn. Engr., Dr. Tao Liu, Ph.D.** is one of the main members of the project team, died unexpectedly in May 2021 shortly after completing the project. **Dr. Tao Liu** is very professional in the research of forensic optical technology. In Memoriam **Sn. Engr., Dr. Tao Liu, Ph.D.** (1981 - 2021).

KEY WORDS Forensic science; Crime scene investigation; Optical technology; Forensic engineering

In the process of crime scene investigation, the discovery and extraction of biological inspection materials is an important task of on-site investigation. Biological inspection materials at the crime scene mainly include sweat, blood, body fluid and exfoliated cells. Biological inspection materials play a vital role in case analysis, suspect determination and case detection. Biological samples contain a variety of information, including location, morphology and DNA information. In practical work, the accurate location and morphology of biological samples are often ignored. The extraction of biological samples, especially potential biological samples, is mostly in the form of blind extraction, this operation cannot obtain the accurate location of biological samples and the morphological information of biological samples. The accurate location and shape of biological samples are very conducive to the analysis and judgment of cases. Therefore, the inspection of biological samples in on-site inspection mainly includes three aspects: the first is the discovery of biological samples, the second is the appearance of biological samples, and the third is the extraction of biological samples. However, the complexity and diversity of the field situation, the different types of samples and the different characteristics

of the object lead to the complexity and diversity of the presentation methods of biological samples. The appearance of biological samples, especially potential biological samples, needs to adopt different methods and means according to the comprehensive characteristics of samples and objects in order to realize the appearance of biological samples. This requires the use of corresponding technologies and methods to effectively and quickly realize the discovery and display of biological samples at the crime scene, especially for the potential biological traces on difficult objects, targeted methods and means are needed to realize the discovery and display of biological samples. Optical display methods are widely used in the investigation of crime scenes. The use of optical display methods can realize the rapid display of the traces and forms of biological samples on the scene. In recent years, with the development of more advanced optical technologies, including infrared, laser and other display technologies, it is possible to quickly find and form the traces of potential biological samples on a variety of difficult objects.

Through experimental research and practical application, this project uses a variety of optical display

technologies to study and explore the rapid display of biological samples at the crime scene, studies the comprehensive application of optical display technology at the crime scene in the rapid display of biological samples, and solves the problem that potential biological traces cannot

be displayed on a large number of difficult objects, For the blood stains on some dark clothes that are difficult to deal with in the past, and the potential biological traces on objects such as bricks, stones, wood blocks and textiles, the accurate extraction of biological samples can be realized.

Conflicts of interests

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