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INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GA/T 819-2023

Forensic sciences - Examination methods for dyes on textile fibers - Thin-layer chromatography and liquid chromatography

法庭科学纤维上染料检验薄层色谱和液相色谱法

(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents" Drafting.

This document replaces GA/T 819-2009 "Analysis Methods for Acid Dyes on Protein Fibers" and GA/T 820-2009 "Polyester Fibers" "Analysis Methods for Disperse Dyes", compared with GA/T 819-2009 and GA/T 820-2009, except for structural adjustments and editorial modifications in addition, the main technical changes are as follows.

---Changed the scope (see Chapter 1, Chapter 1 of GA/T 819-2009 and GA/T 820-2009);

---Added principles (see Chapter 4);

---Deleted the capillary method for dye extraction on fibers (see GA/T 819-2009 4.2.2 and GA/T 820-2009 4.2.2);

---Added the test tube extraction method of dyes on fibers (see 7.2.1);

---Changed the analysis and presentation of thin layer chromatography results (see 8.4, 6.4 in GA/T 819-2009 and 6.4 in GA/T 820-2009 6.4);

---Added high performance liquid chromatography analysis conditions for dyes on acrylic fibers, nylon fibers and cotton fibers (see 9.1);

---Changed the analysis and presentation of liquid chromatography results (see 9.3, 5.6 in GA/T 819-2009 and 5.6 in GA/T 820-2009 5.6);

---Changed the structural schematic diagram of the micro extractor (see Figure A.1 in Appendix A, Figure 1 in GA/T 819-2009 and GA/T 820-

Figure 1 in 2009).

Please note that some content in this document may be subject to patents. The publisher of this document assumes no responsibility for identifying patents.

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1 Scope

This document describes methods for the thin-layer chromatography and liquid chromatography examination of dyes on textile fibers in the field of forensic science.

This document is applicable to the comparative inspection of dyes on polyester fiber, nylon fiber, acrylic fiber, wool fiber, and cotton fiber in the field of forensic science.

2 Normative reference documents

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, the dated quotations for undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to this document.

GB/T 19267.11 Physical and chemical examination of criminal technical trace evidence Part 11: High performance liquid chromatography GA/T 242 Terminology for physical and chemical examination of trace evidence in forensic science

3 Terms and definitions

The terms and definitions defined in GB/T 19267.11 and GA/T 242 apply to this document.

4 Principles

Colored fibers are usually dyed with one or several dye mixtures. Polyester fibers are commonly dyed with disperse dyes, and acrylic fibers are commonly dyed with cationic dyes.

For dyeing with ionic dyes, nylon and wool fibers are commonly dyed with acid dyes, and cotton fibers are commonly dyed with direct, reactive, reducing, vulcanized, and ice dyes. outside Fibers with similar visual colors may be dyed with dyes of different components. The dyes can be extracted from the fibers with solvents and passed through a thin layer of color.

Spectrometry or liquid chromatography is used to compare and analyze the dye components on the fiber.

5 Reagents and materials

Reagents and materials include.

a) N,N-dimethylformamide (C3H7NO, analytical grade);

b) Ethyl acetate (C4H8O2, analytical grade);

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c) Butyl acetate ($C_6H_{12}O_2$, analytical grade);

d) Pyridine (C_5H_5N, analytical grade);

e) Cyclohexane (C_6H_{12}, analytical grade);

f) Tetrahydrofuran (C_4H_8O, analytical grade);

g) Butanone (C_4H_8O, analytical grade);

h) Chloroform ($CHCl_3$, analytical grade);

i) Methanol (CH_4O, analytical grade);

j) Ethanol (C_2H_6O, analytical grade);

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