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**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GA/T 823.4-2018

**Examination methods for paint evidence in Forensics - Part 4:
Raman spectrometry**

法庭科学油漆物证的检验方法 第4部分：激光拉曼光谱法
(English Translation)

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Foreword

GA/T 823, "Inspection Methods of Forensic Science Paint Material Evidence" is divided into four parts.

- Part 1. Color comparison test method;
- Part 2. Infrared absorption spectroscopy;
- Part 3. Scanning electron microscope/X-ray spectroscopy;
- Part 4. Laser Raman spectroscopy.

This part is Part 4 of GA/T 823.

This section is drafted in accordance with the rules given in GB/T 1.1-2009.

Please note that some elements of this document may involve patents. The issuer of this document is not responsible for identifying these patents.

This section is proposed by the National Criminal Technical Standardization Technical Committee Physical and Chemical Inspection Technical Committee (SAC/TC179/SC4) and Centralize.

This section was drafted. Ministry of Justice Scientific and Technological Research Institute of Justice, Material Evidence Identification Center of Ministry of Public Security.

1 Scope

This part of GA/T 823 specifies the laser Raman spectroscopy method for the analysis of paints.

This section is applicable to the inspection and comparison analysis of paint sample components in the forensic science field, and it can also be used in other fields.

2 Normative references

The following documents are essential for the application of this document. For dated references, only the dated version applies to this article Pieces. For undated references, the latest version (including all amendments) applies to this document.

GB/T 14666 Analytical Chemistry Terms GA/T 242 Physicochemical test term for trace material evidence JY/T 002-1996 General rules of laser Raman spectroscopy

3 Terms and definitions

The terms and definitions defined in GB/T 14666, GA/T 242 and JY/T 002-1996 apply to this document.

4 Principle

Raman spectroscopy is an analysis of a scattering spectrum that occurs when the laser is irradiated with a test substance and generates a different scattering spectrum than the frequency of the incident light.

method.

With the change of the frequency of incident light, the frequency of Raman scattering also changes, but the frequency shift of Raman scattering is always maintained.

The Raman shift is not related to the frequency of the incident light, but to the molecular structure, that is, different materials have different vibration and rotational energy levels, so There are different Raman shifts. Raman shift is a physical quantity that characterizes the vibration and rotational energy levels of matter molecules.This is the use of Raman spectroscopy.

Basis for molecular structure analysis and qualitative identification.

When Raman spectroscopy is used to test paints, the obtained spectrum can reflect the main film-forming substances such as oils and resins, paints, dyes, etc.

Raman characteristic peaks of secondary film-forming substances and auxiliary agents such as drier and plasticizer.

5 Equipment and materials

The required equipment and materials are as follows.

- a) Laser micro Raman spectrometer, which can be configured with 514nm, 532nm, 633nm, 780nm or 785nm laser;
- b) stereo optical microscope;

- c) scalpel and forceps;
- d) glass slide (aluminum foil);
- e) double-sided tape;
- f) ethanol cotton balls;