

Processing Evidence Using Potassium Thiocyanate

Table of Contents

1	INTRODUCTION	2
2	SCOPE	2
3	EQUIPMENT	2
4	STANDARDS AND CONTROLS	2
4.1	Sulfuric Acid Solution (Dilute).....	2
4.2	Acetone/Water Solution	2
4.3	Potassium Thiocyanate Solution [Sulfuric Acid Solution (Dilute) + Acetone/Water Solution]	3
5	PROCEDURE	3
6	LIMITATIONS	3
7	SAFETY	3
8	REVISION HISTORY	4

Processing Evidence Using Potassium Thiocyanate

1 INTRODUCTION

This procedure is intended to be utilized by trained personnel to ensure consistency and transparency of methods employed during the enhancement of some patterned impressions observed in dust or dirt evidence received in the Questioned Documents Unit (QDU).

2 SCOPE

These procedures apply to examiners and analysts in the QDU enhancing some patterned impressions created with dust or dirt using potassium thiocyanate.

3 EQUIPMENT

- Balance
- Weighing pans
- Spatulas
- Beakers (10 mL – 200 mL)
- Graduated cylinders (10 mL)
- Glass stirring rod
- Magnetic stirrer
- Magnetic stirring bars
- Pipette
- Non-metallic spray bottles
- Fume hood
- Appropriate Personal Protective Equipment (e.g., gloves, lab coat, eyewear)
- Potassium thiocyanate
- Methanol
- Sulfuric acid
- Distilled water

4 STANDARDS AND CONTROLS

4.1 Sulfuric Acid Solution (Dilute)

- A. In a small beaker, add 1 mL of concentrated sulfuric acid to 9 mL of water, and mix with a glass stirring rod.
 - Make certain that you add the sulfuric acid to the water.
- The Sulfuric Acid Solution (Dilute) must be mixed fresh.

4.2 Acetone/Water Solution

- A. In a 200 mL beaker on a magnetic stirrer, mix 15 mL of water with 120 mL of acetone.
- B. Add 15 grams of potassium thiocyanate.
 - The Acetone/Water Solution must be mixed fresh.

4.3 Potassium Thiocyanate Solution [Sulfuric Acid Solution (Dilute) + Acetone/Water Solution]

- A. Slowly add 8.5 mL of the Sulfuric Acid Solution (Dilute) to the Acetone/Water Solution.
 - o Make certain that you add the sulfuric acid to the Acetone/Water Solution.
 - o The Potassium Thiocyanate solution must be mixed fresh.
- B. Once the Sulfuric Acid Solution (Dilute) is added to the Acetone/Water Solution, a milky mixture will result which will separate on standing. When the layers have separated, remove the top (clear) layer with a pipette and transfer it to a non-metal spray apparatus.
- C. The solution will be tested on a small portion of the dust or dirt impression prior to processing the entire item.
 - o A positive reaction will produce a reddish brown color.
 - o If the background develops a significant color, or the dust does not produce a reddish brown color, the Potassium Thiocyanate solution may not be appropriate for enhancement of this item.
- D. Record the results of the control test in the Chemical Enhancement and Control Logbook located in the Footwear/Tire Laboratory space.

5 PROCEDURE

- A. The solution may be placed in a non-metal spray apparatus and applied by lightly spraying the item(s) under a fume hood.
- B. The item(s) should be allowed to air dry.
- C. At the completion of chemical enhancement, refer to [IMPRS-300 Footwear and Tire Evidence Examinations](#).

6 LIMITATIONS

The color and porosity of the background substrate must be tested prior to use of this reagent. The thiocyanate ion in an acid environment will react with iron ions in the soil to produce a reddish brown color. If there is not iron in the dust or dirt comprising the impression, there will be no color reaction.

7 SAFETY

Standard precautions should be followed for the handling of chemical and biological materials. Chemical and biological materials that are hazardous or potentially hazardous will be maintained and examined in specifically designated areas within QDU space. QDU personnel may refer to the [FBI Laboratory Safety Manual](#) for additional guidance.

All chemicals will be disposed of according to the Chemical Disposal Guidelines on file in the Footwear and Tire Laboratory space.

Safety information concerning each of the chemicals used in these procedures are available from the Material Safety Data Sheets (MSDS) on file in the Footwear and Tire Laboratory space.

8 REVISION HISTORY

Revision	Issued	Changes
02	01/14/2022	Document reformatted for new technical procedure requirements.