

Ink Analysis: An Experiment in Paper Chromatography

© 2008, 2005, 2004, 2002, 1993 by David A. Katz. All rights reserved.

Ink from most ball-point pens and markers can be developed by paper chromatography using 70% isopropyl rubbing alcohol as the eluting solvent.

Materials:

- 5 assorted, different, ball-point pens, black
- Chromatography paper (either one sheet 10 cm x 20 cm, or single strips)
- Beaker, 600 mL
- Stapler
- Watch glass or plastic wrap
- Isopropyl rubbing alcohol
- Pencil
- Ruler, 12 inch
- Safety glasses or goggles

Safety Precautions

Wear safety glasses or goggles to protect your eyes from the alcohol vapors or any splashes.

Isopropyl alcohol is flammable. Avoid sparks or flames. Dispose of waste alcohol in a safe manner.

Procedure

Obtain a sheet of chromatography paper. Hold the paper by the edges to avoid fingerprints which will interfere with the chromatography process.

There will be a pencil line on the chromatography paper about 1 cm from the bottom. This line is called the origin. Also, on the line is a spot that was drawn with a ball point pen. This spot is your unknown and was drawn with one of the five pens you used.

In the laboratory, there is a set of five ball-point pens. Place a small spot of ink from each pen on the pencil line. Space the spots so they are about 2 cm from the edge of the paper and about 2 cm apart. Directly above each spot, label the paper, **in pencil**, with the name or identification of the pen used. (See Figure I-1) The paper is already marked with the identification of the unknown pen spot.

Roll the paper into a cylinder, butt the ends together, but do not overlap them, and staple the paper together.

Add about 25 mL of isopropyl alcohol to the 600 mL beaker. Place the chromatography paper into the beaker. Cover the beaker with a watch glass or with plastic wrap. (See Figure I-2)

Allow the beaker and chromatography paper to sit for up to 30 minutes for the inks to separate. Do not disturb the beaker during this time.

When the inks have separated sufficiently or the ink smears have moved approximately 3/4 of the way up the paper, remove the chromatography paper from the beaker. Open it flat and place it on a paper towel to dry.

Does the ink from the “unknown pen” match any of the inks from the known pens?

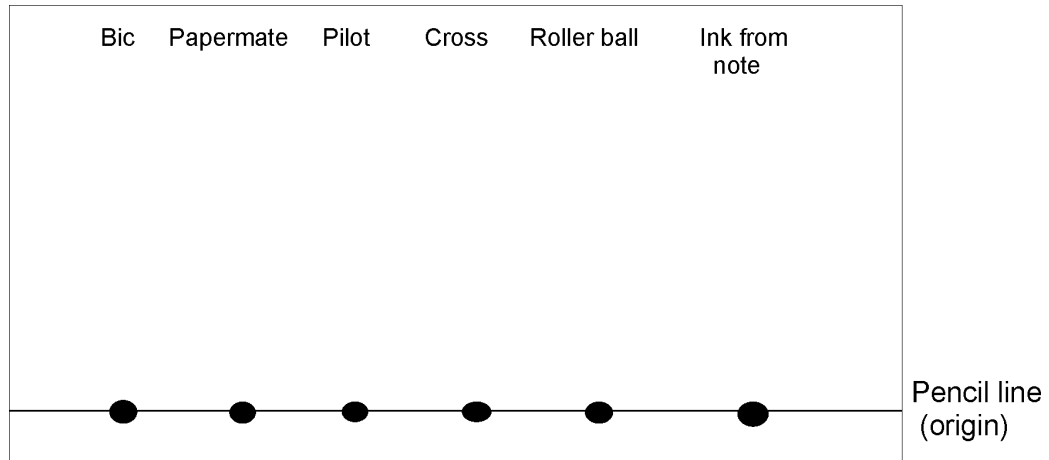


Figure I-1. A sheet of chromatography paper for analyzing ink from several pens at one time.

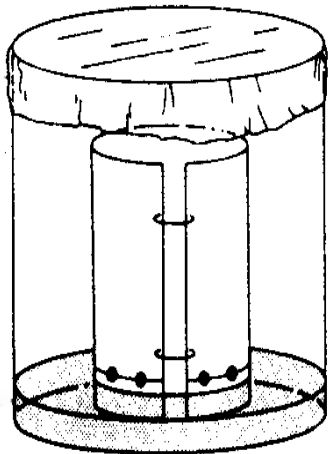


Figure I-2. The chromatography paper placed in a container of alcohol to separate inks.

INK ANALYSIS: An Experiment in Paper Chromatography

Data and Results

Name _____ Course and Section _____

Partner(s) _____ Date _____

Ink Analysis

Attach the chromatography paper to this sheet.

Identifican of the unknown spot: _____

Does the ink from the unknown spot match any of the inks from the known pens? Explain.