Many students enter organic chemistry having already done a form of chromatography in their academic career, either in grade school or in general chemistry. Most likely, this will have been paper chromatography (Figure 2.4), as the materials are cheap but still effective. Paper chromatography can be used to separate the dyes in pens, markers, and food coloring.

![Figure 2.4: Paper chromatography.](image)

When components separate in paper chromatography it is because the components of the mixtures have different attractions to the stationary phase (the cellulose in the paper) and the mobile phase (the solvent wicking up the paper), and spend different amounts of time in each. Thin layer chromatography (TLC) is an extension of paper chromatography and uses a different stationary phase.

- **2.2A: Overview of TLC**
  Using thin layers of stationary phase for separations is called "thin layer chromatography" (TLC), and is procedurally performed much the same way as paper chromatography

- **2.2B: Uses of TLC**
  TLC is a common technique in the organic chemistry laboratory because it can give quick and useful information about the purity of a sample and whether or not a reaction in progress is complete. When low polarity solvents are used, a TLC plate can be complete in less than 5 minutes.

- **2.2C: The Retention Factor**
  A convenient way for chemists to report the results of a TLC plate in lab notebooks is through a "retention
factor", 2 or Rf value, which quantitates a compound's movement

• **2.2D: Separation Theory**
  TLC is an excellent analytical tool for separating mixtures in a sample. In this section are discussed the details of the separation.

• **2.2E: Step-by-Step Procedures for Thin Layer Chromatography**
  A step-by-step procedures for performing Thin Layer Chromatography in the laboratory is shown. Basic troubleshooting including streaky or "blobby" spots or uneven spots.

• **2.2F: Visualizing TLC Plates**
  Organic compounds most commonly appear colorless on the white background of a TLC plate, which means that after running a TLC, chemists often cannot simply see where compounds are located. Visualization methods can be either non-destructive (compound is unchanged after the process) or destructive (compound is converted into something new after the process. Viewing a TLC plate under ultraviolet light is non-destructive, while using a chemical stain is destructive.

---

**Contributors**

- Lisa Nichols (Butte Community College). *Organic Chemistry Laboratory Techniques* is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. Complete text is available online.