Experiment 1: Thin Layer Chromatography

Appendix C: Questions

Answers to questions should be typed and submitted in Appendix C of your Lab Report. Hand written answers will not be graded. Supporting figures, if any, may be neatly hand drawn.

1. Why must the spots applied to a TLC plate be above the level of the developing solvent?

   If the spots are below the level of the solvent they will wash off the TLC plate.

2. How will the Rf value of a compound be affected if the developing solvent is allowed to run off the top of the TLC plate (e.g., the tlc plate is allowed to remain in the developing chamber after the solvent front has reached the top of the plate)? Explain. Be specific.

   The calculated Rf value will be greater than the actual value / will not be accurate.

   Once the eluent reaches the top of the plate it will begin to evaporate. Capillary action will continue to draw the eluent up the plate, along with the sample. In this situation, it is not possible to accurately determine the "distance traveled" by the developing solvent; one can only measure from the origin to the top of the plate. So the distance traveled by the sample will be too large, the distance traveled by the developing solvent will be too small, and the resulting Rf value will be too large.

3. Consider the following compounds when answering the questions below. Assume these compounds can be separated by TLC.

   \[
   \begin{align*}
   \text{A} & \quad \text{B} & \quad \text{C} \\
   \text{O} & \quad \text{O} & \quad \text{O}
   \end{align*}
   \]

   a. Arrange the above compounds in order of increasing Rf in a TLC analysis.

      \[\text{B} < \text{C} < \text{A}\]

   b. A TLC plate is spotted with each of the the three compounds. The plate is developed using hexanes:ethyl acetate (5:95) to give the chromatogram shown below. How could you change the solvent system to give better separation of these three compounds?

      Reduce the polarity of the developing solvent by using a system that contains more hexanes.