Discussion:

This experiment allowed us to perform a Thin Layer Chromatography (TLC) which helped us separate different materials based on affinity and capillary action. Three different variables, such as stationary phase, a mobile phase, and an analyte (the compound to be analyzed) were used in this TLC experiment. Our stationary phase was silica, which was pressed onto aluminum. The mobile phases used were a variety of solvents: pure Hexane, 10% Ethyl Acetate in Hexane, 25% Ethyl Acetate in Hexane, 50% Ethyl Acetate in Hexane, 75% Ethyl Acetate in Hexane, and finally pure Ethyl Acetate. The analytes being studied were 9-fluorenone, Vanillin , and a mixture of the two. I started off by making all 6 my TLC plates at once, of which I had to repeat several times due to human error. After successfully creating a batch of loaded TLC plates, I then prepared my developing chambers. As we only had two per person, I began with pure Hexane and the 10% solution. While keeping the TLC plates in the solutions, I may have dropped them a little higher than necessary, which may have caused the analytes to shift up slightly. I then watched and waited for the solution to reach the line, at which point I took them out and left to dry. I then repeated these steps after washing and cleaning my developing chambers, making sure to try not to drop the TLC plate too high into the solution. After all 6 TLC plates were dried, I then put them under the UV light to analyze their movements. Having the distances the analyte and the solvent front travelled, I was able to calculate the retention factors, Rf , between the mobile phase and the stationary phase. Looking at the results, we can see a few general trends. First, we can note that the vanillin had a higher affinity with the stationary phase, as in all the trials, it moved the least. This proves that the vanillin was more polar than the 9-fluorenone. Our second general trend was that as our mobile phase changed from a higher percentage of Hexane to a lower percentage (and opposite for the Ethyl Acetate), the analytes moved more. This proves that the Ethyl Acetate was more polar than the Hexane, as it “overpowered” the polarity of the silica. The most appropriate mobile phase to use to obtain the best separation of the compounds (based on my results) would be the 25% Ethyl Acetate in Hexane as neither Rf values were above .8 or below .2.

Conclusion:

We performed a Thin Layer Chromatography (TLC) in this lab using silica TLC plates (as our stationary phase), 6 different solvents (as our mobile phases), and 3 analytes (as our compounds to be analyzed). The 3 analytes were loaded onto a TLC plate and then put into the developing chamber each of the different solvents. After all the TLC plates showed the solvent reaching a specified location, they were removed and left to dry. The TLC plates were then analyzed under a UV light, and then distances of movements were measured. We calculated only 2 Rf values per plate as 1 of the 3 analytes were a mixture. A few general trends were found, such as how the more polar analyte traveled farther, and the more polar solvent pushed the analytes farther. The best overall solvent to be used to separate the compounds would have been the 25% Ethyl Acetate in Hexane as neither of its Rf values fell below .2 or above .8. This experiment was a success as the TLC results followed the trend.