

Experiment 26

TLC of Reactions: Isomerization of Dimethyl Maleate

Study Questions

- 1) Which compound, dimethyl maleate or dimethyl fumarate, should be more strongly adsorbed onto the silica gel? Why is this? **Answer:** Dimethyl maleate, because the compound is cis and has a larger dipole moment and therefore is more polar and will be adsorbed more strongly.
- 2) Which isomer, dimethyl maleate or dimethyl fumarate, should be the more stable isomer? Explain. **Answer:** Dimethyl fumarate should be the more stable isomer because of steric factors – the ester groups at either end are more crowded together if they are on the same face, as they are in dimethyl maleate.
- 3) A student is running this reaction and sees a strong TLC spot for dimethyl fumarate, but no crystals form when the student adds hexanes and cools the mixture. What might the student do to recover their product? **Answer:** There is still too much DCM mixed with the hexanes, and the product is staying dissolved instead of crystallizing out. The student can reheat the mixture and boil off more of the DCM, then return it to the ice bath. The boiling point of DCM is 39.8°C and the boiling point of hexanes is 68.7°C, so heating the solution should reduce the relative amount of DCM and cause the product to become insoluble.