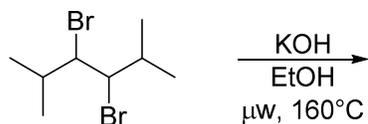


Experiment 36

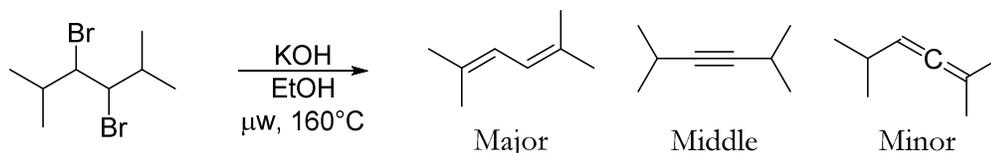
Alkyne Formation: Double E2 Dehydrohalogenation

Study Questions

- 1) If you were to place two reaction vessels in the microwave reactor, one filled with pure deionized water and one filled with salt water, which would heat up faster, and why? **Answer:** The salt water would heat up faster because it is being heated by both dipolar polarization and ionic conduction. The deionized water is being heated only by dipolar polarization.
- 2) What would happen if you were to rinse the composite sleeve for your reaction vessel with water immediately before running it in the microwave reactor? **Answer:** Since water absorbs microwaves (it is a medium-absorbing solvent), the water would heat up. Depending on how quickly this happened, it might damage the composite sleeve or reaction vessel, or only release water vapor into the reactor. It would also block some of the microwaves from reaching the contents of the reaction vessel.
- 3) What do you predict the ^1H NMR and ^{13}C NMR spectra will look like for the product? What are some likely contaminants that will be visible by NMR? **Answer:** ^1H NMR will show peaks in aromatic region only (7.5-7.1 ppm according to SDBS). ^{13}C NMR will show peaks in aromatic region (132-123 ppm) and alkyne region (89 ppm). Likely contaminants are ethanol, water, unreacted starting material, and possibly alkene from a single elimination. KBr will not be visible.
- 4) Show all possible double-elimination products if this reaction were performed on the molecule below, and label the major and minor products based on what you know of alkyne/alkene stability. Based on this outcome, why was stilbene a good choice of starting material for this experiment?



Answer:



Since it is possible for this molecule to form a conjugated alkene, this is actually the expected major product since it's more stable than the alkyne. It is also possible to form the cumulated diene, which is less stable. Stilbene was chosen as a precursor since there is only one possible location for any eliminations to occur, due to the lack of any other β protons.