Experiment 38

Grubbs Metathesis: Synthesis of a Natural Product from Eugenol

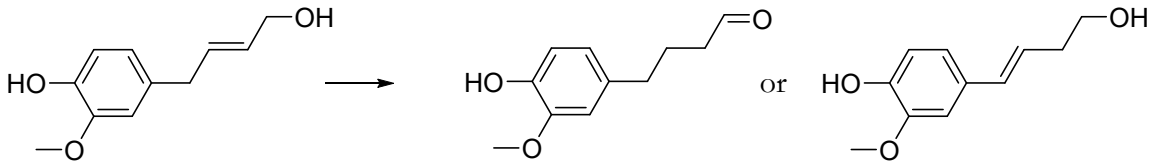
Study Questions

1) While running TLCs of this reaction, you may notice a large pale spot with a very high R_f value. Given what you mixed into the reaction, what is this spot likely to be? **Answer:** The paraffin wax that was mixed with the catalyst.

2) While preparing for this lab, you find two bottles of Grubbs catalyst in wax. Both are known to be several decades old (this is especially surprising since the Grubbs catalyst was not invented until 1992). In one bottle, the wax has been ground to a fine powder, but in the other it is in large pieces. Which bottle will probably work better to catalyze your reaction? **Answer:** The large pieces, since they have less surface area and oxygen will have diffused into them less.

3) What might happen to the purity of your isolated product if you increase the solvent polarity too quickly? What if you increase it too slowly? **Answer:** If you increase it too slowly, your compounds will take a long time to come off the column and require a large amount of solvent, but they will probably be reasonably pure. If you increase it too quickly, your compounds will probably be mixed up together and not well separated.

4) Ruthenium complexes can move the location of double bonds within a molecule to form more stable isomers. If the reaction mixture were allowed to stir over the entire semester, giving the double bond a chance to move multiple steps along the chain, what might be the structure of the major side product? **Answer:**



More stable due to C=O bond energy being greater than C=C bond energy

More stable due to conjugation of C=C bond to aromatic ring