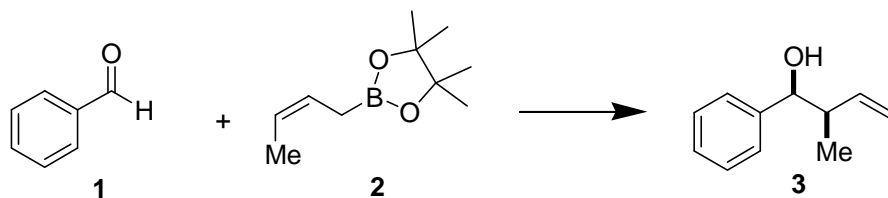


Problem Set No. 6 (28.5.2013)

1. Draw the structure of the (*S,S*)-BINAP-ligand and the Noyori catalyst derived from this ligand. Which product do you expect for the reduction of hydroxyacetone with this system?

2. What is a dynamic kinetic resolution? Try to describe a “theoretical” case with a racemic ketone giving a product with two stereogenic centers!

3. Addition of (*Z*)-crotylboronate **2** to benzaldehyde **1** leads to the formation of product **3** in racemic form.



a) How can you prepare compound **2** in a stereoselective manner?

b) Why is **3** the preferred diastereomer? Provide a suitable drawing (transition state model) which is rationalizing this result. What is the name of this model?

c) How can compound **3** be converted into a β -hydroxyaldehyde (equivalent to an aldol addition product)? Give exact reaction conditions!

4. a) Which major product will you obtain by the reaction of (*E*)-crotyl pinacol boronate to (*R*)-2-benzyloxypropanal (following the Felkin-Anh rule). Draw the major product and assign the absolute configuration of the two new stereogenic centers!

b) There are two selectivity terms to be applied: diastereofacial selectivity and simple diastereoselectivity. Please explain these terms with the example above!