

Problem Set No. 6 (5.6.2012)

1. Prepare the CBS reagent derived from D-proline (give all steps and reagents) and do a reduction of acetophenone! Which face of this ketone will be attacked in preference, *Re* or *Si*?
2. Reduce methyl 4-oxopentanoate with baker's yeast and treat the resulting product with acid to provide a γ -lactone!
3. The diastereoselective addition of cyanide using cyano(trimethyl)silane (in the presence of a catalytic amount of Lewis base) to (*R*)-2-benzyloxypropanal follows the Felkin-Anh rule. Draw the major product and assign the absolute configuration of the two stereogenic centers!
4. Which major product will you obtain by the reaction of (*E*)-crotyl pinacol boronate to *N,N*-dibenzyl-protected (*S*)-2-amino-3-phenylpropanal? Draw the transition state of this reaction leading to a compound with three contiguous stereocenters.

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

5. E.J. Corey proposed a new chiral allylation reagent for the enantioselective addition to aldehydes. Draw the two possible transition states (attack from front or back) for this reaction explaining why one side of the aldehyde is attacked preferentially.

