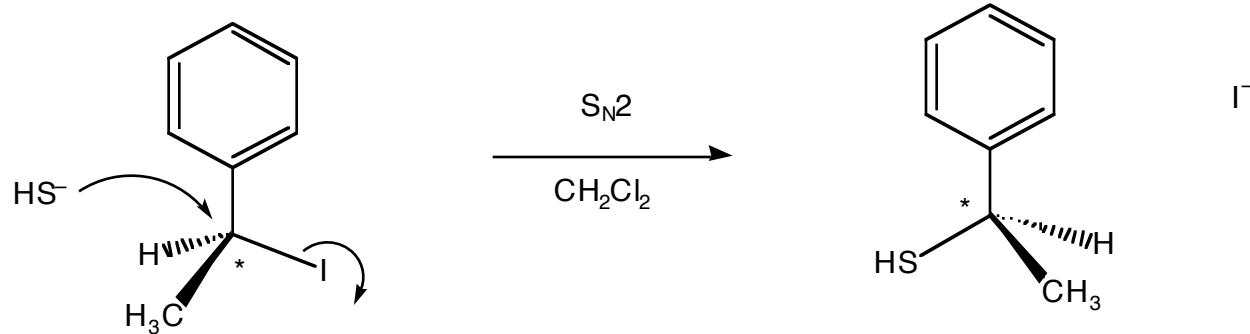


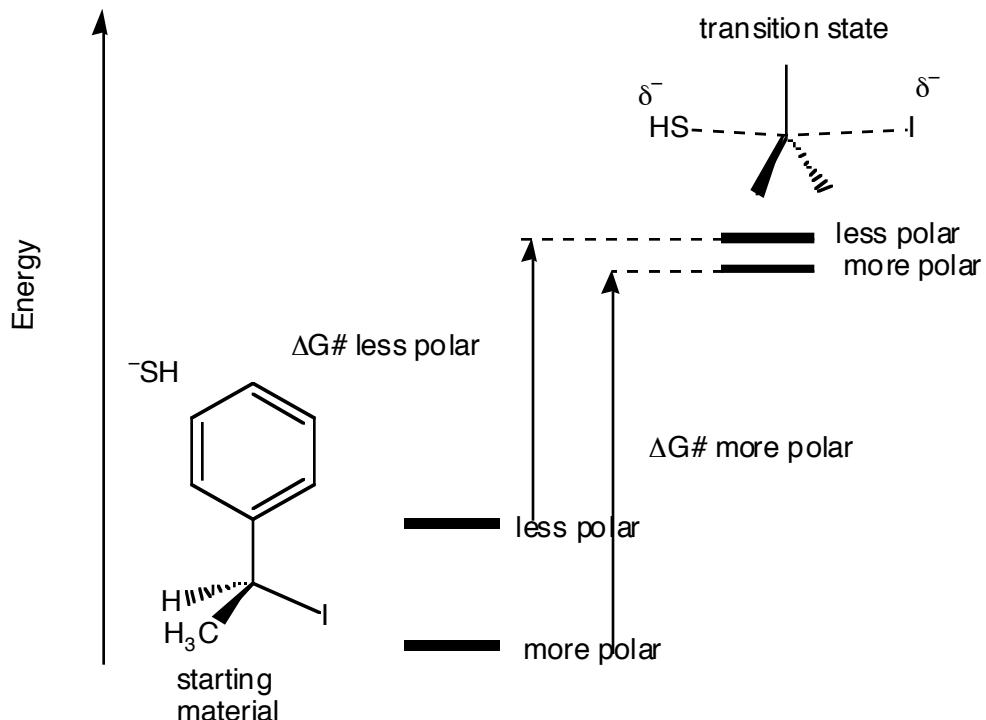
Answers to Problem 55, Chemistry 301X - 2006

(a)

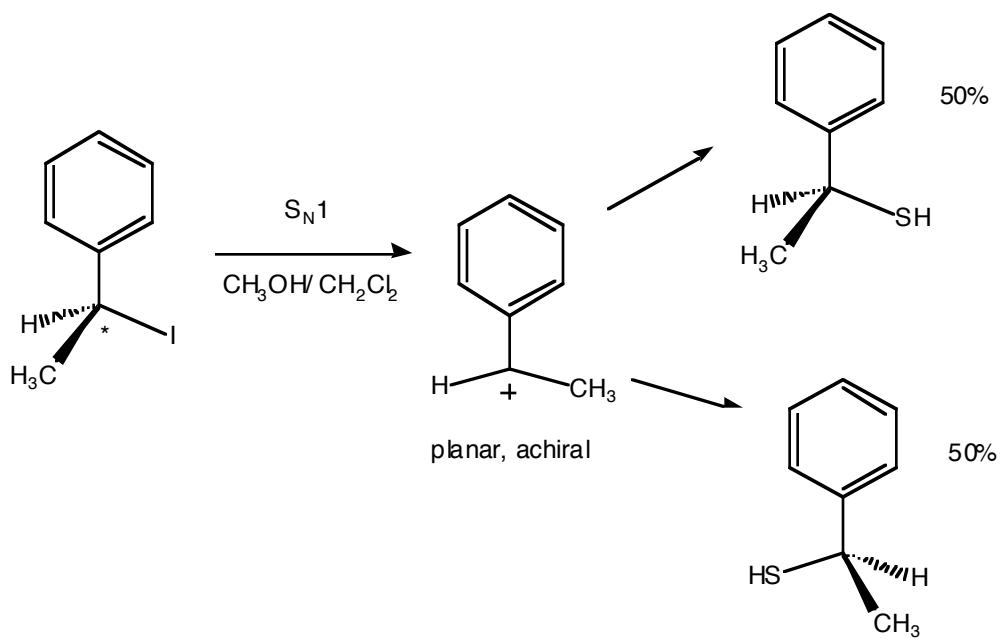


b. *S*
 c. *R*
 d. you can't tell.

e. In this case, changing to a less polar solvent would increase the rate of reaction. The ionic starting material, with a thiolate with a full negative charge, is more stabilized by a polar solvent than is the transition state in which the charge is dispersed.



f. In the more polar solvent system, the $\text{S}_{\text{N}}1$ reaction begins to compete with the $\text{S}_{\text{N}}2$ reaction. Ionization leads to a planar cation that is achiral. The achiral intermediate must produce a racemic product. Thus, the rotation of the product, **2**, will be reduced.



g. It will eventually become pure S_N1 and the product will be racemic - zero rotation.