

Massachusetts Institute of Technology

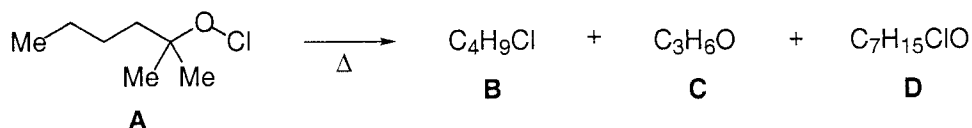
5.13: Organic Chemistry II

Spring 2003

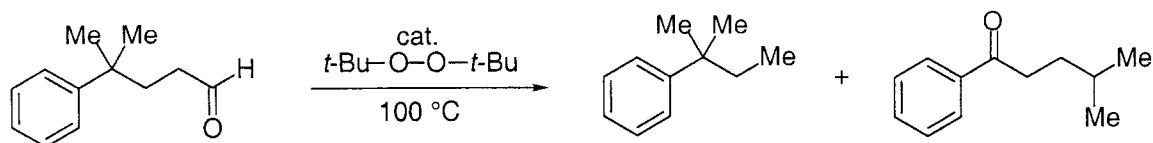
Problem Set 10: Radicals and Photochemistry

For practice before the Final Exam

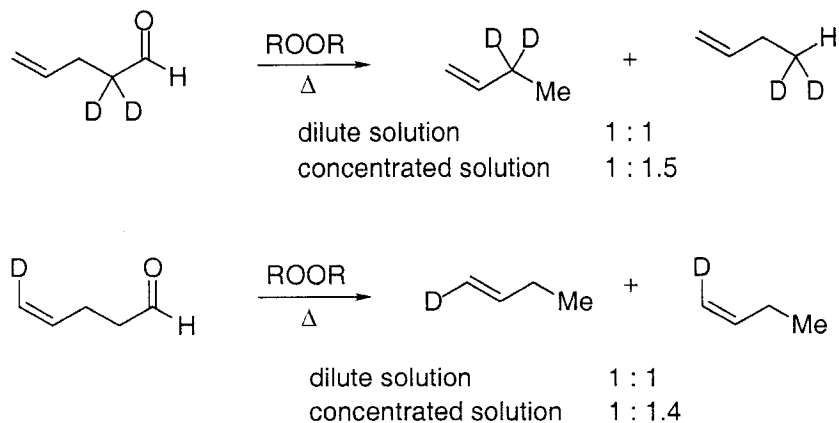
- (1) Compound **A** is converted to **B**, **C**, and **D** upon heating. The reaction is accelerated by irradiation. Provide the structures of **B**, **C**, and **D**, and illustrate the pathways by which they are formed.



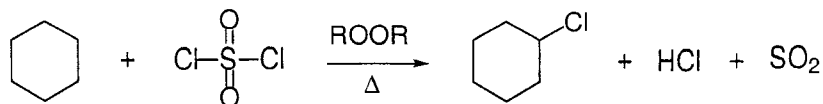
- (2) Provide a mechanism for the formation of each of the illustrated products.



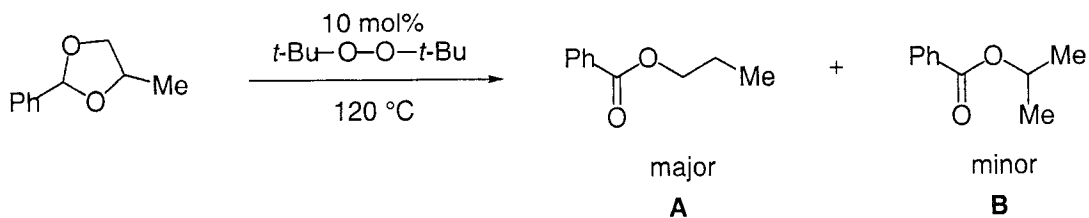
- (3) The decarbonylation of the two labeled pentenals shown below has been studied.



- (a) Provide a mechanism for the formation of each of the four products.
 (b) For each reaction, explain the effect of concentration on the product distribution.
- (4) Provide a mechanism for the illustrated reaction. Show the initiation and the propagation steps.

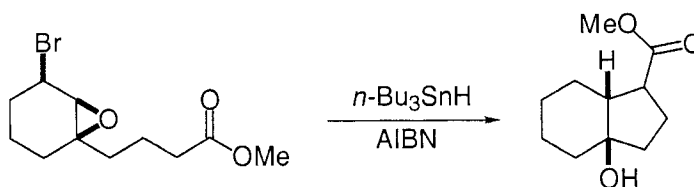


(5) (a) Suggest a mechanism for the formation of each product.

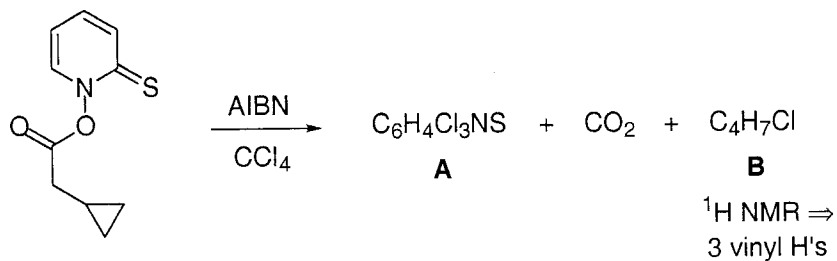


(b) Rationalize the predominant formation of **A**.

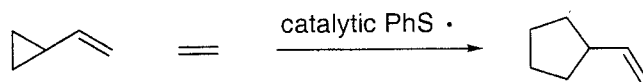
(6) Provide a mechanism. Include arrow pushing.



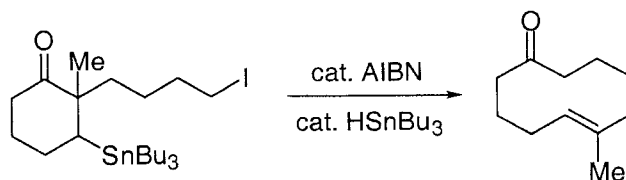
(7) Identify **A** and **B**, and provide a mechanism (initiation and propagation) for the radical chain process that leads to their formation. Please show arrow pushing.



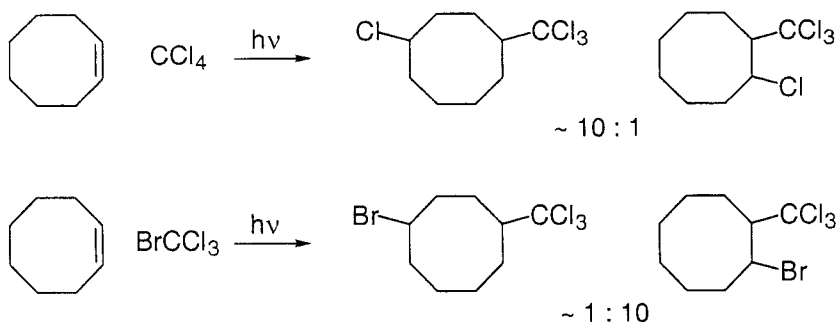
(8) Provide a mechanism for the illustrated reaction. Please show arrow pushing.



(9) Provide a mechanism.

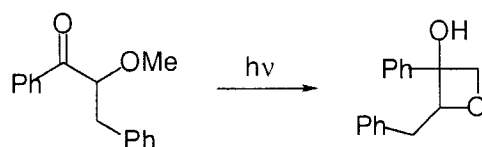


(10) (a) Provide a mechanism for the following reactions.



(b) Account for the difference in product distribution between the reaction of CCl_4 and BrCCl_3 .

(11) Provide a mechanism for the illustrated transformation. Please include arrow pushing.



(12) Give structures for **C** and **D**. Provide a mechanism for their formation.

