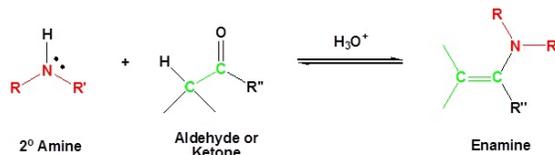


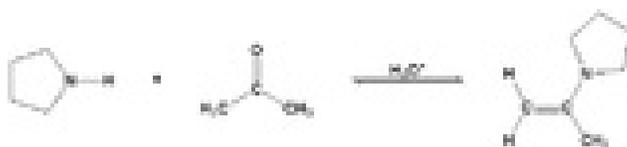
19.3: Addition of 2° Amines

Introduction

Most aldehydes and ketones react with 2°-amines to give products known as **enamines**. It should be noted that, like acetal formation, these are acid-catalyzed reversible reactions in which water is lost. Consequently, enamines are easily converted back to their carbonyl precursors by acid-catalyzed hydrolysis.

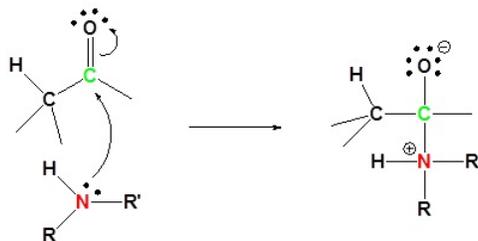


Example

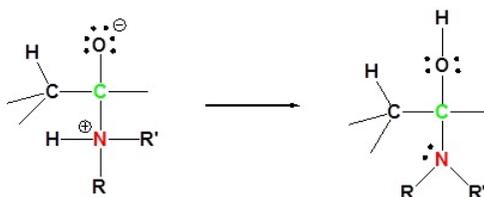


Mechanism

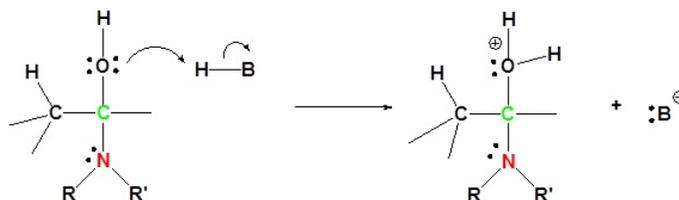
1) Nucleophilic attack



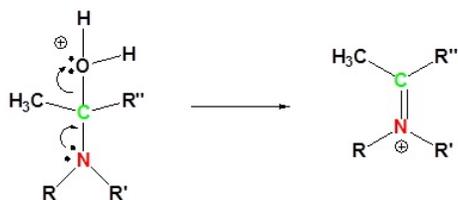
2) Proton transfer



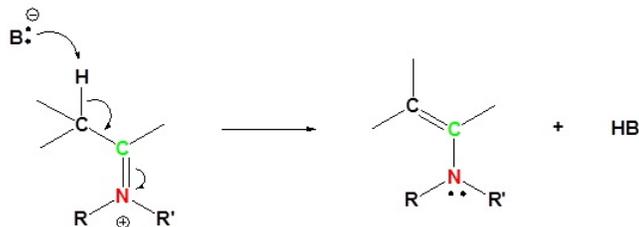
3) Protonation of OH



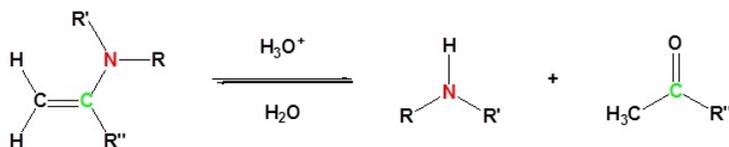
4) Removal of water



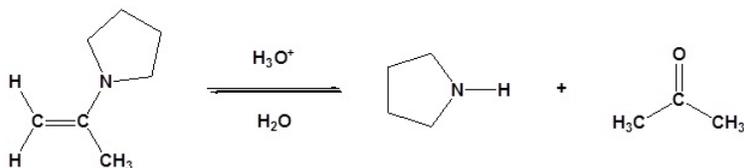
5) Deprotonation



Reversibility of Enamines

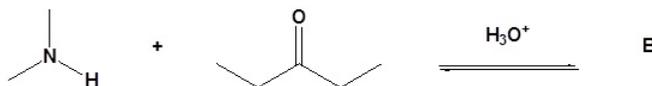
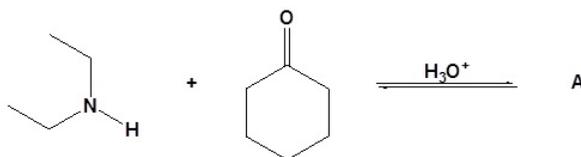


Example

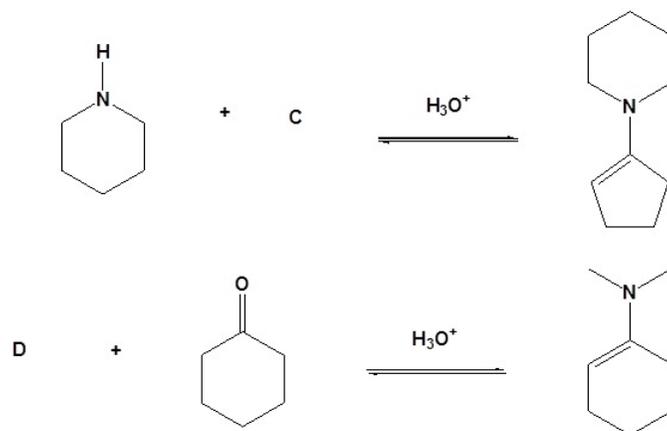


Problems

1) Please draw the products for the following reactions.

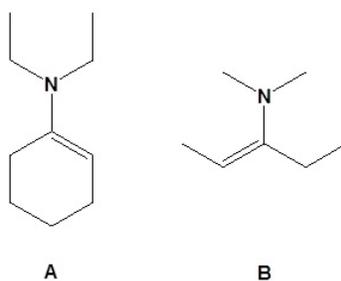


2) Please give the structure of the reactant needed to product the following product

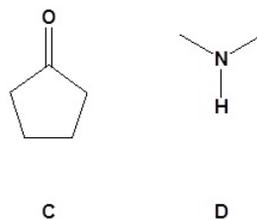


Answers

1)



2)



Contributors

- Prof. Steven Farmer ([Sonoma State University](#))
- William Reusch, Professor Emeritus ([Michigan State U.](#)), Virtual Textbook of Organic Chemistry

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