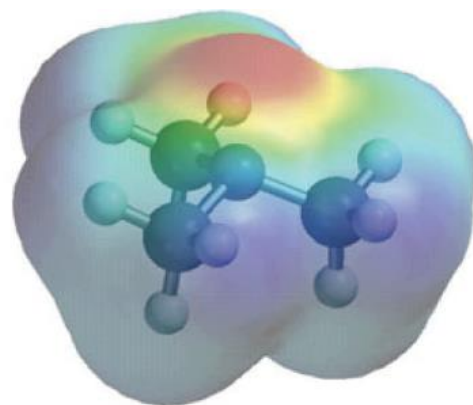


Amines – Amines as Nucleophiles



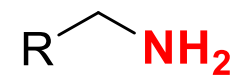
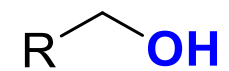
Instructor: Dr. Tanatorn Khotavivattana

E-mail: tanatorn.k@chula.ac.th

Recommended Textbook:

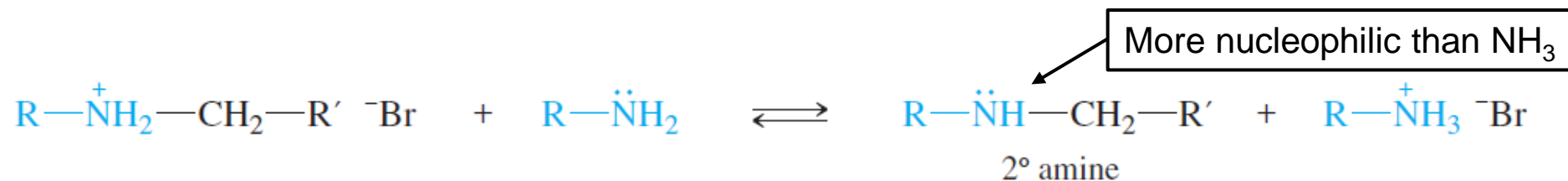
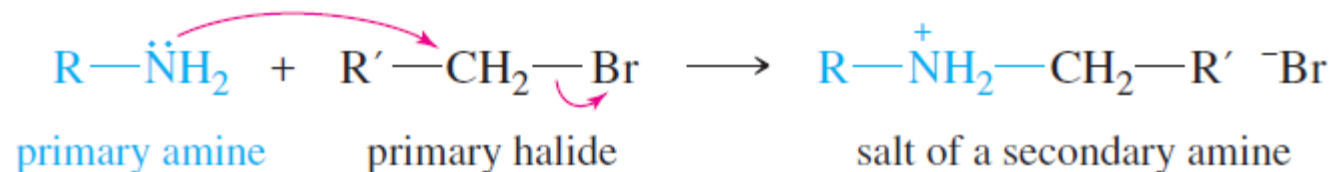
Chapter 19 in *Organic Chemistry*, 8th Edition, L. G. Wade, Jr., **2010**,
Prentice Hall (Pearson Education)

Amines as Nucleophiles – Amine vs Alcohol

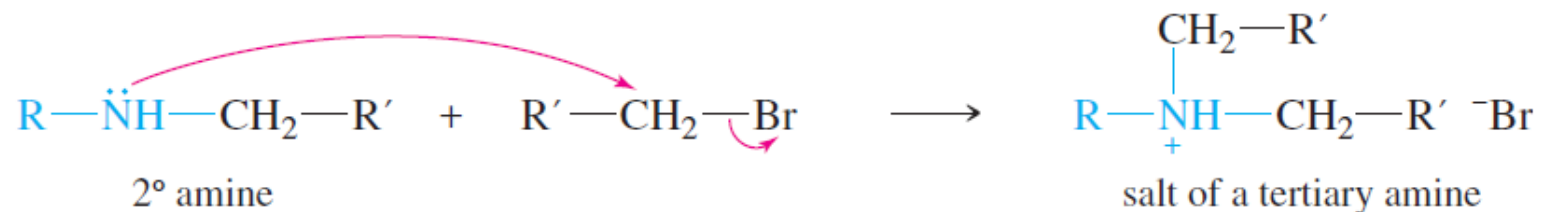


Reactions of Amines – Amine as a Nucleophile

Alkylation with Alkyl Halides

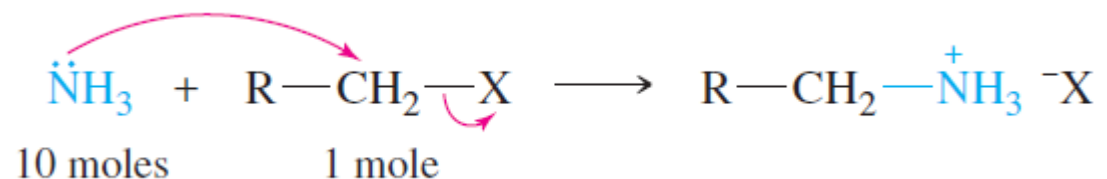


- Reaction of amines with **alkyl halides** is complicated by **overalkylation**



Alkylation with Alkyl Halides

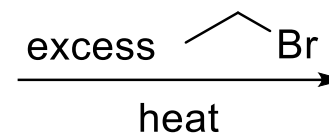
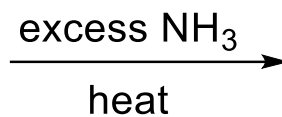
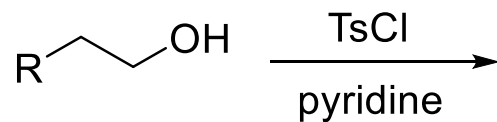
Simple primary amines can be synthesised, however, by adding a halide or tosylate to a **large excess** of ammonia



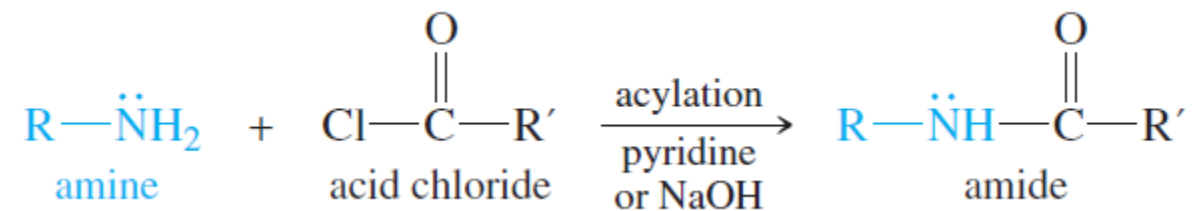
Reactions of Amines – Amine as a Nucleophile

Alkylation with Alkyl Halides - Example

Suggest the products of the following reactions:

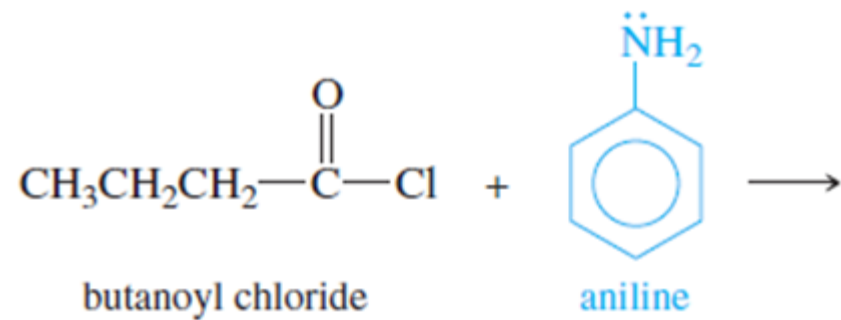


Acylation with Acid Chlorides



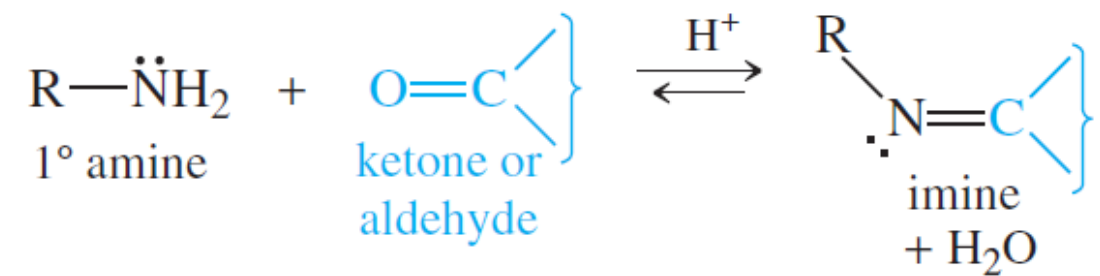
Reactions of Amines – Amine as a Nucleophile

Acylation with Acid Chlorides - Example



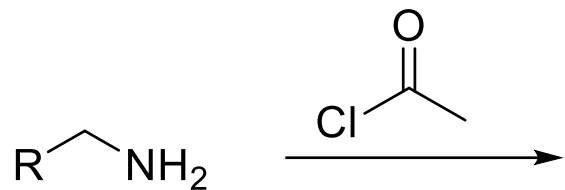
Reactions of Amines – Amine as a Nucleophile

Immine formation with Aldehydes and Ketones

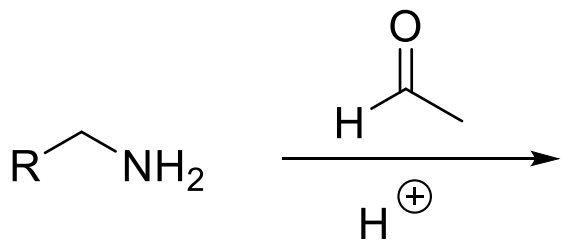


Acylation vs. Immine formation

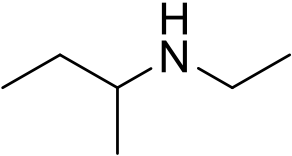
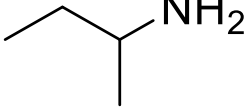
Acylation



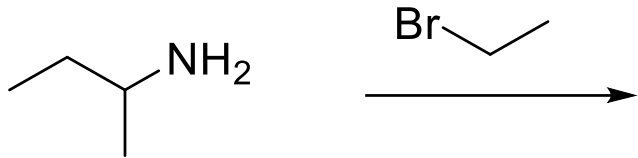
Immine formation



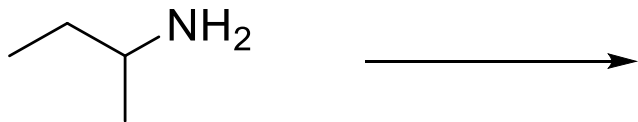
Extra: Reductive ammination

Suggest a synthesis of  from 

#1 Alkylation

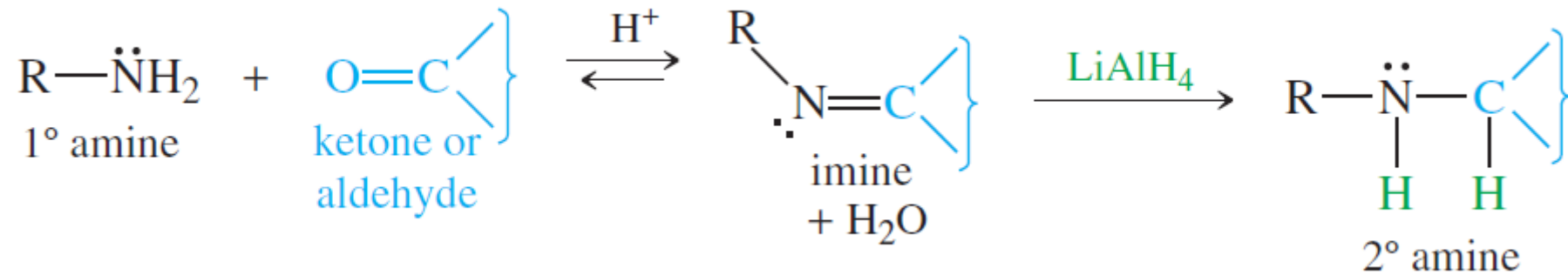


#2 Reductive Ammination



Extra: Reductive ammination

- ***The most general amine synthesis***
- **Two-step procedure**
 - Formation of **imine** from **ketone** or **aldehyde**
 - Reduction of **imine** to **amine** with **Reductants such as NaBH₄**



Reactions of Amines – Amine as a Nucleophile

Examples: Predict the products of the following reactions

