*CHEM 342 – Lecture 1 06/01/15*

Handouts: - Course Outline Overheads: - Today’s Outline

- Best & Worst - Lab Schedule

- Who are you - What do you need to know

- Find someone who

- Review Sheets (on moodle)

1) Icebreaker: Find Someone Who

2) Course Outline

Go over outline

Test Schedule

Group Project

Lab Schedule & Info

3) What Do You Need to Know?

* Everything from Chem 241 & 242!!!
* General Reactivity trends / Mechanisms
* Acids/Bases
* Resonance
* “Specific” Reactions (review sheets on moodle)

4) Group Exercise: Best & Worst?

Discussion: Each group has 1 minute to present best and worst, then vote!

5) Mechanisms of Reactions

* Key to understanding reactions
* Help us predict reaction products!
* Challenge: proposing mechanisms for “new” reactions
* If we discover a new reaction, we must be able to propose a reasonable mechanism in order to publish.

and provide experimental support/proof

Key point: “There is nothing new under the sun” (almost never!)

* If you are proposing a step in a mechanism that you have never seen before, it is most likely wrong! (look instead for new combinations of steps)

How to propose a mechanism:

\*\*keep in back of your mind where you are going (products) but focus on the reactants:

What are they most likely to do?

\*\*Only use reactants provided (don’t add what you think you need to get there!)

\*\*always consider if you are working in acidic or basic solution



e.g.

Remember: most organic reactions are acid/base

E+ Nu-

3 Questions to Ask:

1. What is the strongest acid?

Will generally react together

1. What is the strongest base?
2. Is there a good leaving group?

I– > Br– > Cl– > > F–

–OSO2R (eg tosyl)

OH– , OR– ? for SN1, SN2 etc, only if protonated first:

ROH → ROH2+ H2O = LG



BUT:

Why can CH3O– leave in acyl substitution but not in SN2?

→ because there is a – charge in the molecule to help kick it out!



* If there is a negatively charged atom attached to the same C as the LG, almost anything can leave

\* Only H‑ and R3C‑ cannot leave → horrible LG’s!

Example:



[ \* Basic solution HCN + NaOH → H2O + Na+ CN– ]

* This is a new reaction to us – but each step should be “normal”

Proposal #1 – SN2 (or SN1)



Is it reasonable?

What is wrong?

CH3CH2O­ is NOT a good enough LG for SN2 or SN1!

Proposal #2

* Instead of focusing on product, focus on reactants:



Q1: What is the strongest acid? HCN

Q2: What is the strongest base? OH­

HCN + OH­ → H2O + CN–

Q1: What is the strongest acid? R-OH

Q2: What is the strongest base? CN­ or OH­ (depends if excess NaOH)



Q3: Is there a good LG? NO YES – because neg. charged

atom on same C



…. Try to finish mechanism for next class!

So far:



1. Acid/Base
2. LG leaves from tetrahedral intermediate “I know all these reactions” ☺
3. Nu­ adds to C=O
4. Acid/base