Acids and Bases – 3 - Reactions

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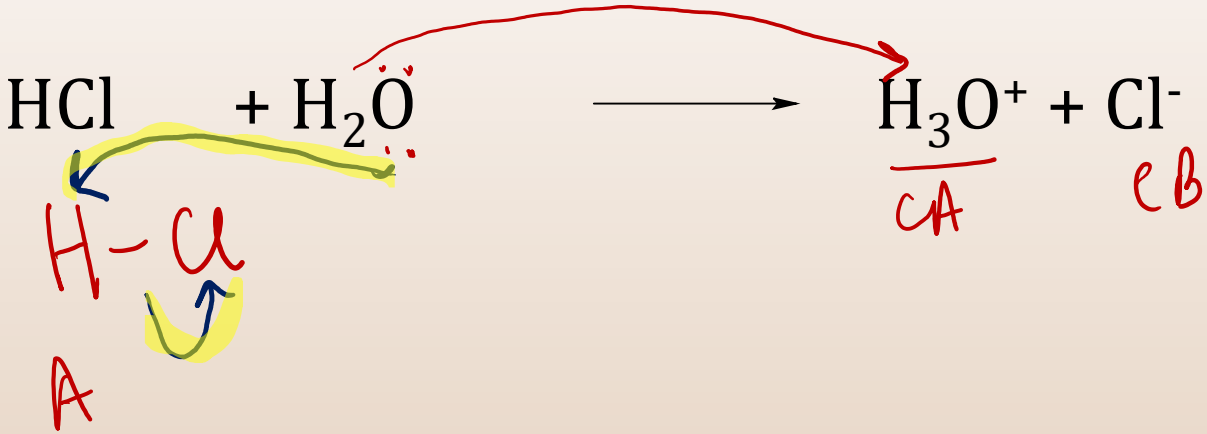
Acids and Bases

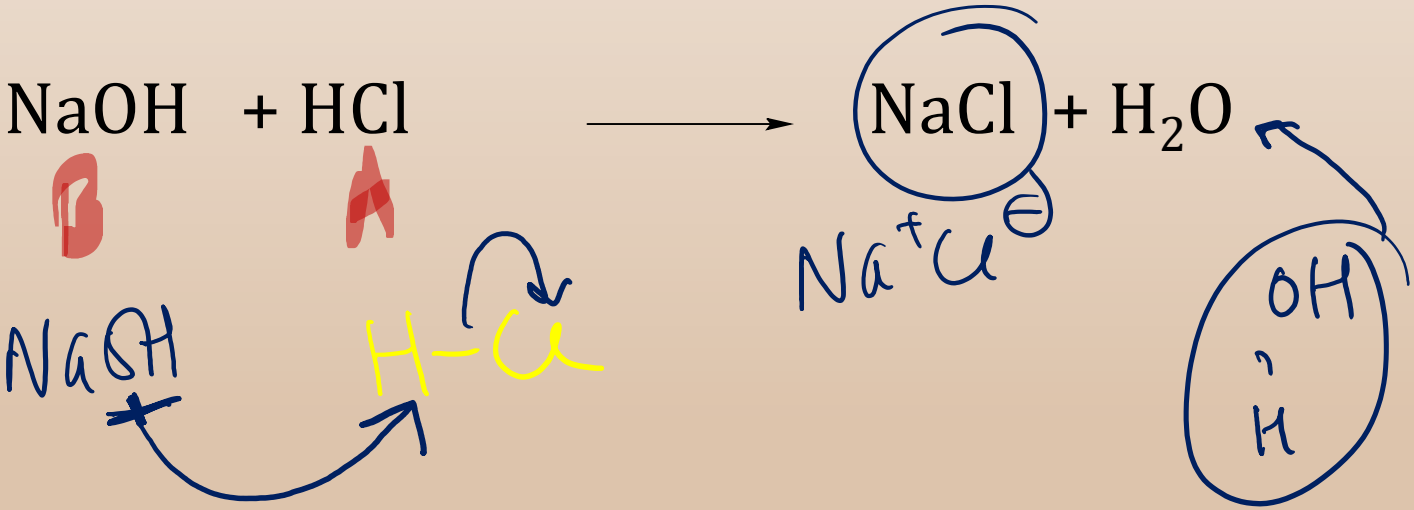
- **Arrhenius Acids and Bases** – acids give protons and bases give hydroxide.
- **Bronsted Lowry Acids and Bases** – acids give protons and bases accept protons.
- **Lewis Acids and Bases** – acids accept a pair of electron and bases give a pair of electrons.

For regular acids and bases there is a pKa scale to help determine if reactions will take place; there is no pKa scale for Lewis acids and bases. Their effectiveness is determined by how well they donate or accept electrons.

When and why does an acid base reaction occur? When correct starting materials are present. The only reason a reaction will occur is to give weaker acid and base (conjugates).

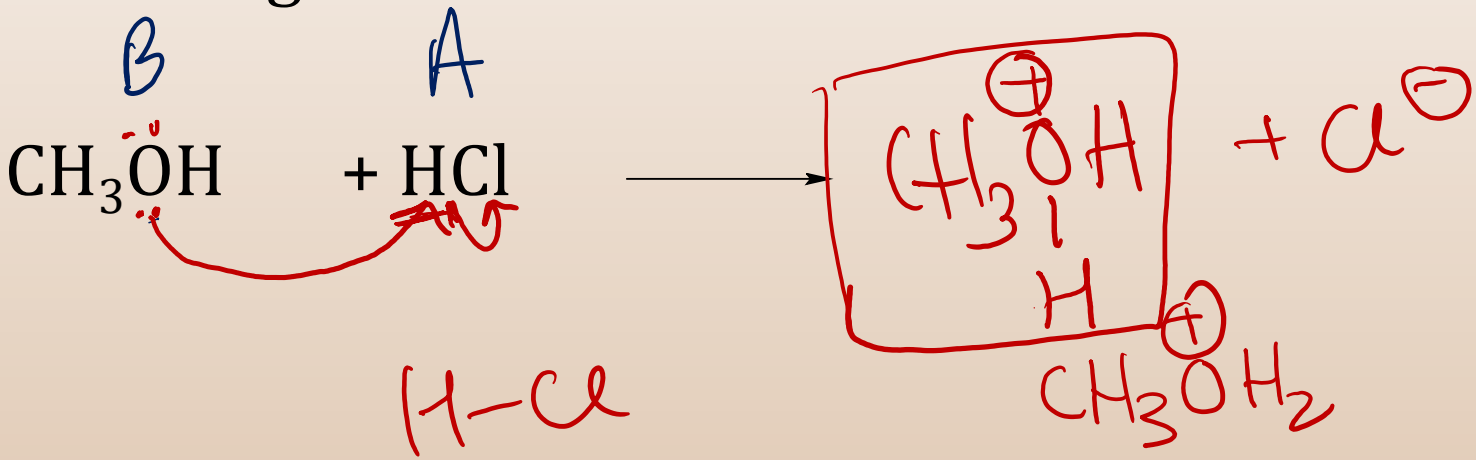
Examples of Acid Base Reactions

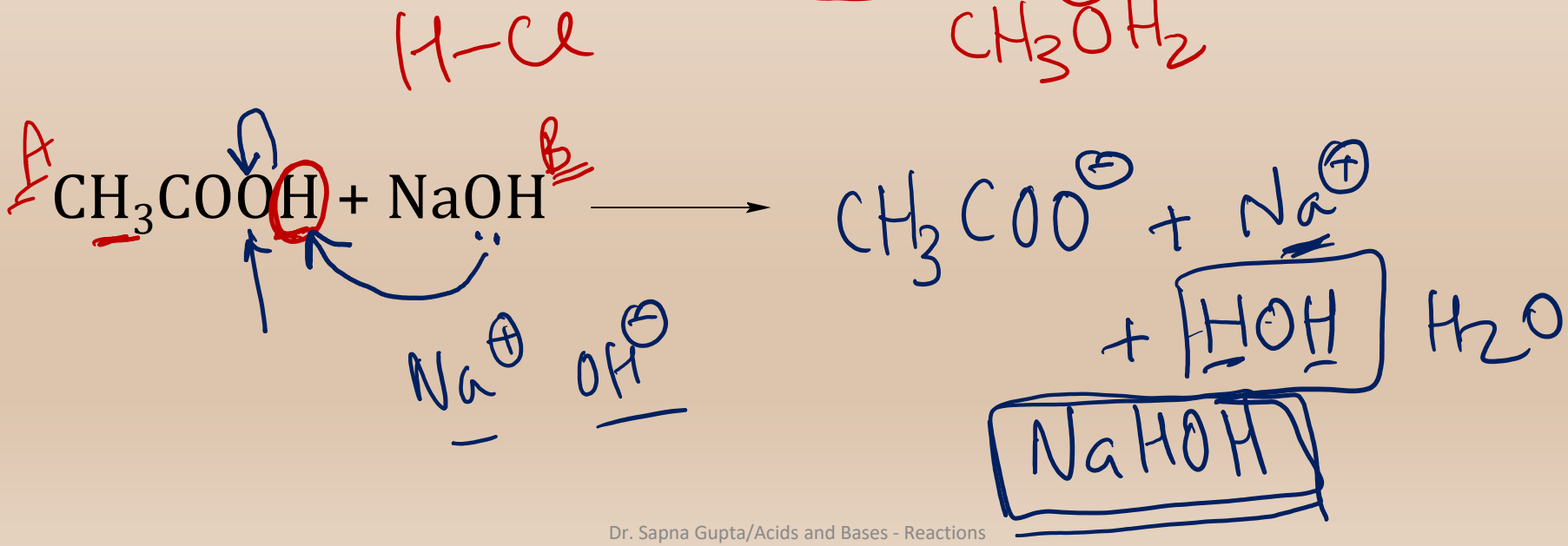




More Examples

Show the arrows and the products for the following reaction.

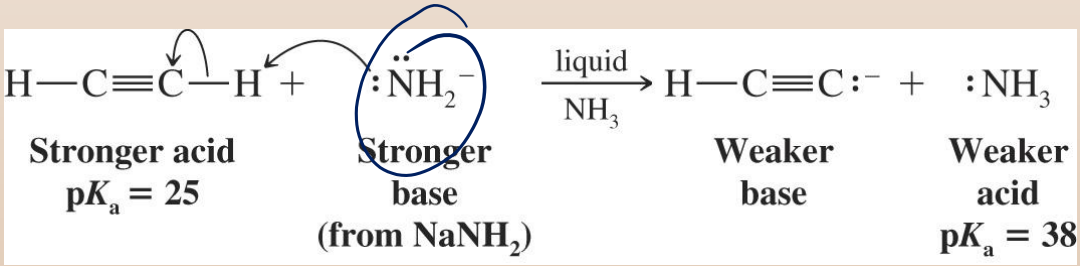




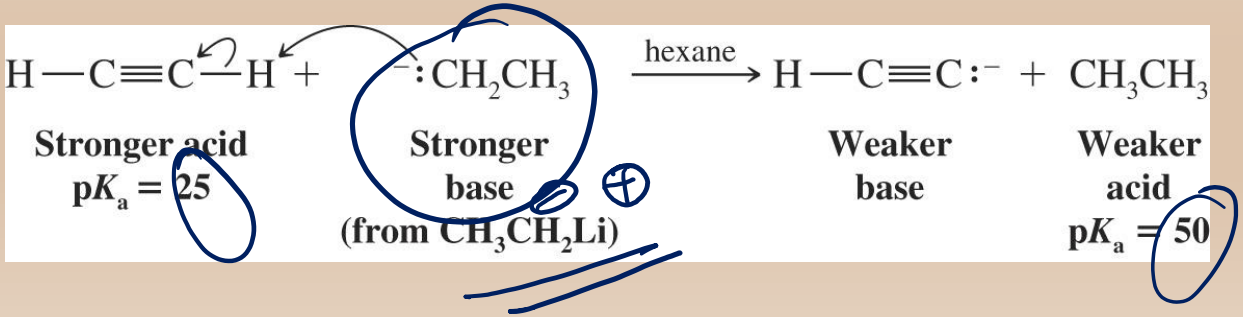
Examples of Some Acid-Base Reactions

- Any base stronger than hydroxide will be converted to hydroxide in water

- Sodium amide can be used as a strong base in solvents such as liquid NH3



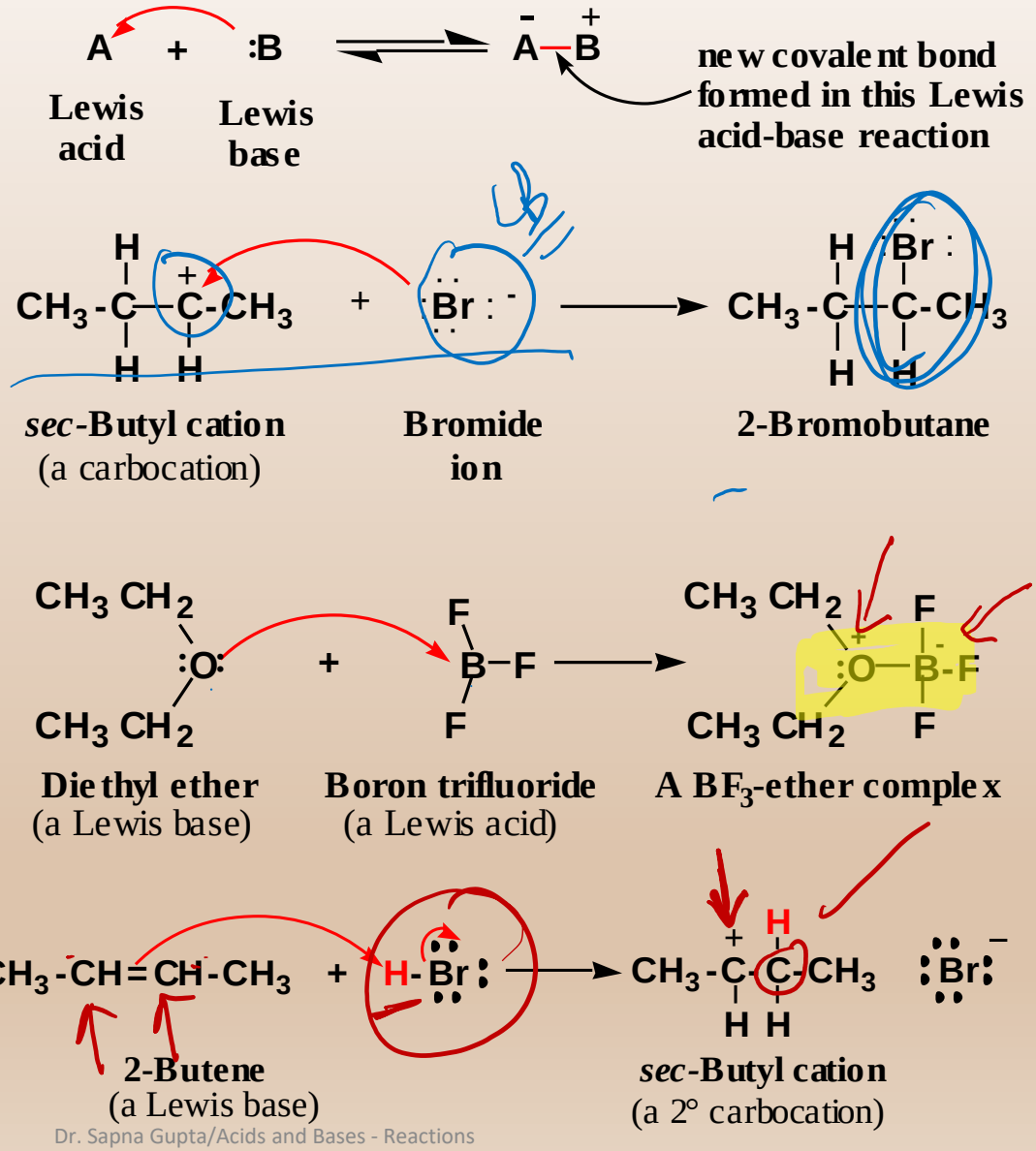
- Alkyl lithium reagents in hexane are very strong bases



Lewis Acid Base Reactions

Examples

- For writing Lewis acid base reactions look for electron poor and electron rich sites.
- Electron poor sites are cations and incomplete valence shell.
- Electron rich sites are anions, lone pair of electrons, double and triple bonds.
- *NOTE: all the red arrows indicate an electron pair is being transferred.*



Predicting Reaction Occurrence

a) $CH_3COOH + KOH \longrightarrow CH_3COO^{\ominus} + H_2O + K^{\oplus}$

b) $CH_3CH_2CH{=}CH_2 + H_2O \longrightarrow$ NR

c) $CH{\equiv}CH + NaOH \longrightarrow CH{\equiv}C^{\ominus} + H_2O + Na^{\oplus}$

d) $CH_3CH_2OH + CH_3O^{-} \longrightarrow CH_3CH_2O^{\ominus} + CH_3OH$

Key Words/Concepts

- Be able to draw arrows in acid base reactions
- Be able to predict products.
- Be able to predict if a reaction will take place or not.