

A blue spiral-bound notebook with silver metal rings along the top edge. The cover is plain blue with a fine, woven texture.

Acids and Bases (Parts 1 & 2)

UCI Chem 51A
Dr. Link

Goals

- After this lesson (parts 1 & 2) you should be able to:
 - 1. Identify a compound as acidic, basic, or amphoteric
 - 2. Differentiate between differing acid and base definitions.
 - 3. Predict the products of an acid/base reaction, identifying all components.
 - 4. Compare acidities based on pK_a .
 - 5. Predict to which direction the equilibrium will lie for an acid/base reaction.

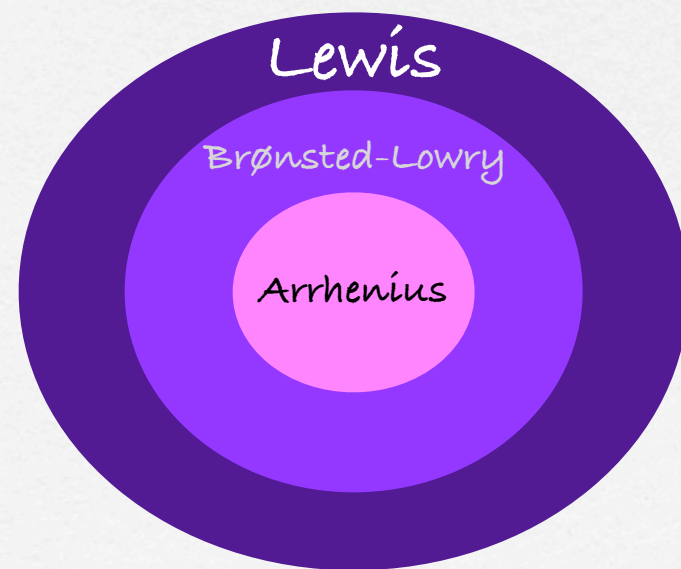
Acid & Base Definitions

- A long time ago (1884): Arrhenius
 - Acids
 - Bases
- And then (1923): Brønsted-Lowry
 - Acids
 - Bases

FAQ: Do I need to memorize dates?

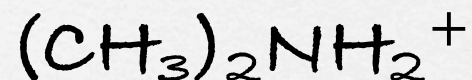
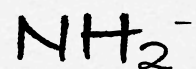
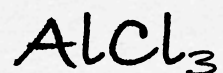
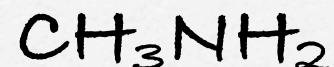
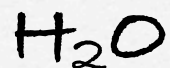
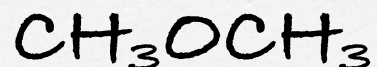
Yet Another Definition

- Also in 1923: Lewis
 - Acid
 - Base



Acid & Base Examples

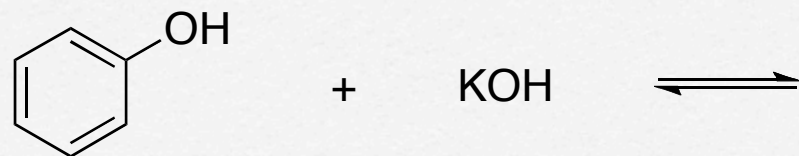
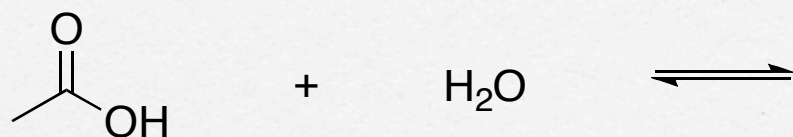
□ Acid? Base?



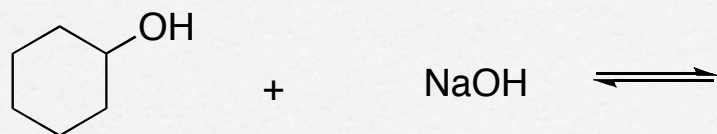
Amphoteric: species that can act as acid or base,
depending on conditions

Acid-Base Reactions

□ Brønsted-Lowry acid & bases (Lewis later)

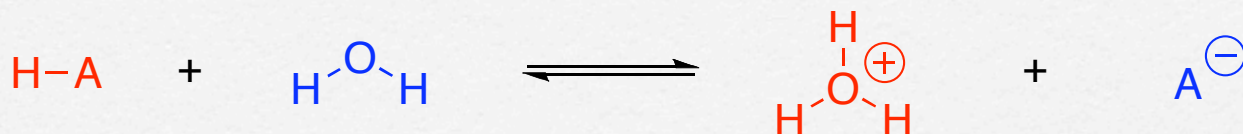


More Reaction Examples



pKa & Acid Strength

□ Acid strength can be denoted using pKa

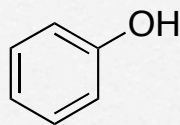


$$K_a = \frac{[\text{H}_3\text{O}^+][\text{A}^-]}{[\text{HA}]}$$

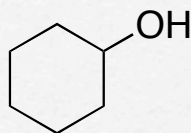
$$\text{p}K_a = -\log K_a$$



K_a	$\text{p}K_a$
1.8×10^{-5}	4.8



1.6×10^{-6}	10.0
----------------------	------

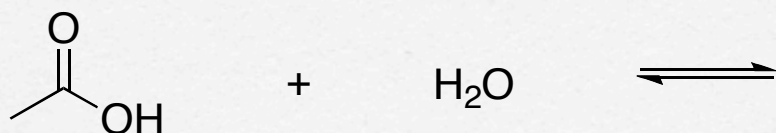


$\sim 1 \times 10^{-16}$	~ 17
--------------------------	-----------

FAQ: Do I need to memorize pKa values?

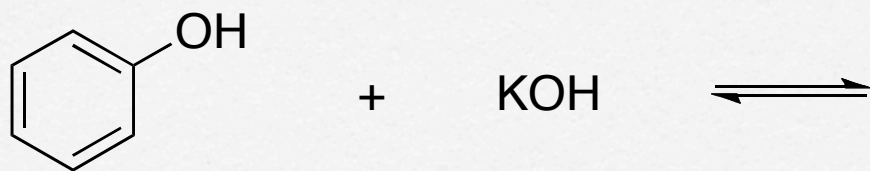
Acid-Base Equilibrium

- If acid-base reactions are in equilibrium, how do we know to which direction the equilibrium lies?

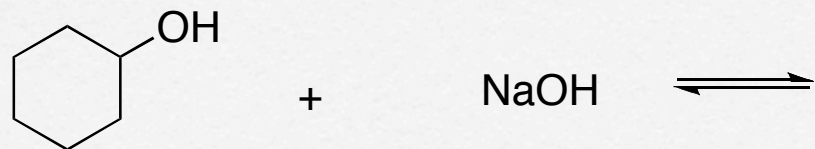
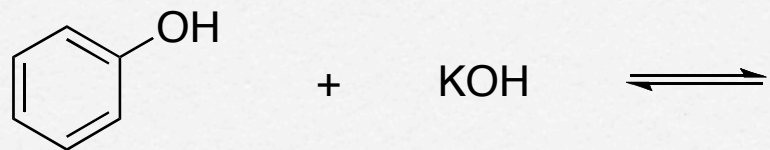


Equilibrium Practice

□ To which direction does the equilibrium lie?



A Closer Look



Lewis Acid-Base Reactions



Wrapping Up

- Practice identifying acids and bases using Brønsted-Lowry and Lewis definitions.
- Practice writing acid-base reactions and identifying acid/base/conjugate acid/conjugate base.
- Practice using curved arrow notation to show the process of acid base reactions (Brønsted-Lowry and Lewis).
- Practice predicting the direction of equilibrium for acid base reactions.