

ORGO ACIDS & BASES

CHEAT SHEET

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Arrhenius

Acid = Litmus Red
 H^+ in H_2O

Base Litmus Blue
 OH^- in H_2O

Bronsted-Lowry

H^+ donor
 ex. HCl

Accepts H^+
 ex. $NaOH$

Lewis (electrons)

Accepts e^- pair
 ex. $AlCl_3$

e^- pair donor
 ex. Cl^-

Acid - Base Reaction



Equations to recognize

$$K_a = \frac{[H^+][A^-]}{[HA]} \quad pK_a = -\log(K_a) \rightarrow K_a \propto [H^+] \propto \frac{1}{pK_a}$$

Strong Acid

$\uparrow [H^+]$

$\uparrow K_a$

$\downarrow pK_a$

Weak Acid

$\downarrow [H^+]$

$\downarrow K_a$

$\uparrow pK_a$

$$pH = -\log [H^+] \\ pOH = -\log [OH^-]$$

$$pH + pOH = 14 \\ pK_a + pK_b = pK_w = 14$$

pH scale
 $pH \rightarrow$
 $\leftarrow pOH$

$pH = 1$
 Acidic
 $pOH = 14$

$pH = 7$
 Neutral
 $pOH = 7$

$pH = 14$
 Basic
 $pOH = 1$

STRONG ACIDS FORM STABLE CONJUGATE BASES

CARIO

C = charge of acid or conj. base

A = Atom holding charge

R = Resonance

I = Inductive effect

O = orbital / hybridization

See videos for full explanation + examples LEAH4SCI.COM/acidbase

Charge: $+ / \delta^+$ more acidic } when compare species
 $- / \delta^-$ more basic }

Atom: In same period $\uparrow$ eneg $\uparrow$ acidity
 In same group $\uparrow$ size $\uparrow$ acidity



Resonance: $\uparrow$ Res $\uparrow$ charge distribution
 $\uparrow$ acidity (Aromaticity = $\uparrow$ stable)

Inductive Effect: $\uparrow$ e-neg nearby atom
 $\uparrow$ acidity

Orbital / hybridization $\uparrow$ % s $\uparrow$ acidity
 $sp = 50\% > sp^2 = 33\% > sp^3 = 25\%$

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Study Guide Acid And Base Reactions

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