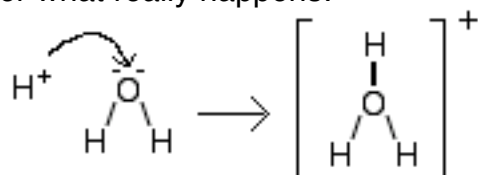


1. Arrhenius' defn:

a. An acid is a substance that increases the concentration of H^+ ions in water.

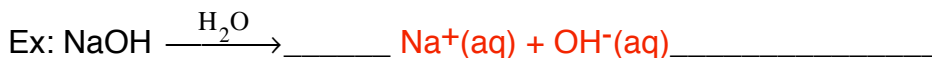


Consider what really happens:

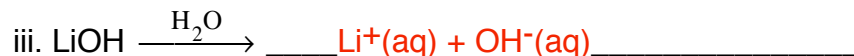


So an acid increases the $[\text{H}_3\text{O}^+]$ in water. Note: the square brackets mean concentration (moles per liter).

b. A base is a substance that increases the concentration of OH^- ions in water.



c. So here's how to write the dissociation, or ionizing, of acids and bases in water:



2. The strength of acids and bases:

a. A strong acid or base is one that completely dissociates in water

Ex: HCl (hydrochloric acid)

Ex: $\text{HC}_2\text{H}_3\text{O}_2$ (acetic acid, or vinegar)

Ex: H_3PO_4 (phosphoric acid, or cola acid)

b. The six main strong acids (pg 460): HCl , H_2SO_4 ,

HNO_3 , HClO_4 , HBr , HI

c. The strong bases: OH^- combined with alkali metals
(like Na or K) or with alkaline earth
metals (like Ca or Mg)

3. Mono protic vs. Poly protic acids

a. Examples of monoprotic acids: HCl, HNO₃

b. Examples of polyprotic acids: H₂SO₄, H₃PO₄

i. These dissociate in steps:



4. Indicators: Substances that change color in the presence of an acid, base, or bo

a. Phenolphthalein:

Color in a basic solution like NaOH: hot pink (magenta)

Color in a neutral solution like water: clear and colorless

Color in an acidic solution like HCl: clear and colorless

b. Universal Indicator (a combination of many different indicators):

Color in a basic solution like NaOH: blue or purple

Color in a neutral solution like water: green

Color in an acidic solution like HCl: red

c. Natural Indicators - found in plants (Ex: purple cabbage juice):

Color in a basic solution like NaOH: green

Color in a neutral solution like water: purple

Color in an acidic solution like HCl: red