

Chem 115 notes, 2/28/08

The further away a solution is from pH of 7 on either side, the stronger it is.  
-pH measures (by way of logarithm) the concentration of  $\text{H}_3\text{O}^+$  ( $\text{H}^+$ ) in solution

Acids

- Taste sour
- Sharp odor
- Corrosive
- Solution conducts electricity
- When a chemical that is an acid is added to water, it increases the  $\text{H}^+$  concentration in the solution
- Registers less than 7 on pH scale because  $[\text{H}^+]$  is greater than neutral water

**Strong acids (pH 1-4)**

- HCl
- HBr
- HI
- $\text{HNO}_3$
- $\text{H}_2\text{SO}_4$
- $\text{HClO}_4$

Sulfuric acid: Most produced chemical in industry

- Sulfuric acid used to clean gasoline, some residue. So when your car burns fuel, emissions go into air creating acid rain.

pH is essentially the opposite sign of the exponent of 10 in the scientific notation of the  $\text{H}^+$  concentration.

Example:  $1.0 \times 10^{-7}\text{M}$  = concentration of  $\text{H}^+$  ions in pure water.  
So  $10^{-7}$  for concentration of  $\text{H}^+$  is 7 on pH scale

**Neutralization reaction:**

Acid + base  $\longrightarrow$  salt +  $\text{H}_2\text{O}$

**Strong Acid and strong base examples**

$\text{HCl} + \text{NaOH} \longrightarrow \text{NaCl (soluble salt)} + \text{H}_2\text{O}$

$\text{H}_2\text{SO}_4 + \text{KOH} \longrightarrow \text{KHSO}_4 \text{ (soluble salt)} + \text{H}_2\text{O}$

(strong electrolyte)

**Weak acid**

$\text{HF} + \text{NaOH} \longrightarrow \text{NaF} + \text{H}_2\text{O}$

Net ionic equation is  $\text{HF(aq.)} + \text{OH}^-(\text{aq.}) \longrightarrow \text{F}^-(\text{aq}) + \text{H}_2\text{O} (l)$

Weak acid present as molecules, so doesn't cancel out of net ionic equation.

### Group Problem #4

Write the net ionic equations

- $\text{HClO}_2 (aq.) + \text{LiOH} (aq.) \longrightarrow \text{LiClO}_2 (aq.) + \text{H}_2\text{O} (l)$ 
  - $\text{HClO}_2 (aq.) + \text{OH}^- (aq.) \longrightarrow \text{ClO}_2^- (aq.) + \text{H}_2\text{O} (l)$
- $\text{HNO}_3 (aq.) + \text{Ca(OH)}_2 (aq.) \longrightarrow \text{Ca(NO}_3)_2 (aq.) + \text{H}_2\text{O} (l)$ 
  - $\text{H}^+ (aq.) + \text{OH}^- (aq.) \longrightarrow \text{H}_2\text{O} (l)$