Neutralization Reactions

Acid/Base Neutralization

• A salt is any compound that can be derived from the neutralization of ______________.
• The word "neutralization" is used because the acid and base properties of H+ and OH- are destroyed or ________________.
• In the reaction, H+ and OH- combine to form ______ or ______ (_________ molecules).
• A neutralization reaction is a type of ______________ ______________.

Writing neutralization equations

Example: Write the chemical reaction when lithium hydroxide is mixed with carbonic acid.
Step 1: write out the reactants
LiOH + H₂CO₃ →
Step 2: determine products...(make sure the salt is written with correct subscripts! Refer to Oxidation Chart.)
Remember the "________________" method from Chapter 20
Step 3: balance the equation
LiOH + H₂CO₃ → Li₂CO₃ + H₂O

Writing neutralization equations

Example: Complete the neutralization reaction...
Ca(OH)₂ + H₂SO₄ →
Step 1: already completed for you
Ca(OH)₂ + H₂SO₄ →
Step 2: determine products...(make sure the salt is written with correct __________! Refer to Oxidation Chart.)
Step 3: balance the equation
Ca(OH)₂ + H₂SO₄ → H₂O + CaSO₄

Practice

Write balanced chemical equations for these neutralization reactions.

1) Ba(OH)₂ + HCl
2) calcium hydroxide + nitric acid
3) Al(OH)₃ + H₂SO₄
4) KOH + HClO₂
Titration

Titration-process of determining the _______ of an acid or a base.

Titration Animation

Titration

An __________ is added to the solution being titrated. The indicator is a substance that changes color when the reaction is complete. Phenolphthalein, which is a commonly used acid-base indicator, is added to the acid solution in a flask.

Phenolphthalein has two chemical forms. In acidic conditions it is __________. In basic conditions it turns __________.

Phenolphthalein

Titration

Slowly and carefully, the __________ is added to the acid/phenolphthalein mix. When the mix turns from __________, the acid has been neutralized by the base. At that point you know exactly how much of the base solution it took to neutralize the acid.

Natural Indicator

Hydrangeas are natural indicators. When the pH of the soil is __________, they produce blue blossoms. When the pH of the soil is __________, pink blossoms.

Cabbage is another natural indicator. When __________, deep red color; when __________, lavender; when __________, yellow-green.

Applying Science

You have learned that neutralization reactions change acids and bases into salts. Antacids typically contain small amounts of Ca(OH)$_2$, Al(OH)$_3$, or NaHCO$_3$, which are bases. The base in the antacid is meant to neutralize the excess acid in your stomach causing your tummy ache.

1) What compounds are produced from a reactions of HCl and Mg(OH)$_2$?

2) Why is it important to have some acid in your stomach?

Applying Science

3) How could you compare how well antacid products neutralize acid? (Hint: Titrations?) What procedure could you use?