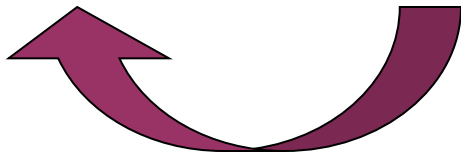


Neutralization

In general: Acid + Base \rightarrow Salt + Water

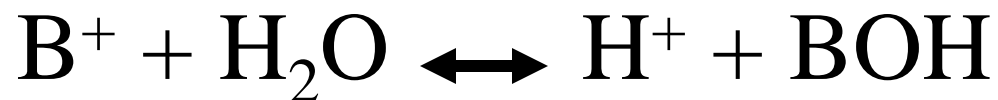
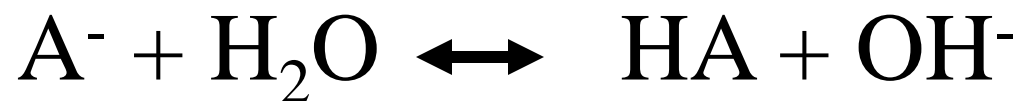
All neutralization reactions are double displacement reactions.



Salt Solutions

- When salts dissolve, their ions can recombine with water

Salt Solutions



Salt Hydrolysis

To determine if a salt will form an acidic or basic solution, remember the following rules:

Strong acid + Strong base → Neutral solution

Strong acid + Weak base → **Acidic** solution

Weak acid + **Strong base** → **Basic** solution

Acid-Base Properties of Salt Solutions

- Salt solutions are affected by *salt hydrolysis*, in which ions produced by the dissociation of a salt react with water to produce either hydroxide ions or hydronium ions—thus impacting pH.
- ***Basic salt solutions*** - an anion that is the strong conjugate base of a weak acid reacts with water to produce hydroxide ion.



- *Neutral salt solutions*

- A salt composed of the cation of a strong base and the anion of a strong acid produces a neutral solution.
- These ions do not hydrolyze in water.

For example:



- ***Acidic salt solutions***

- When the cation of a salt is the strong conjugate acid of a weak base, a solution of the salt will be acidic.

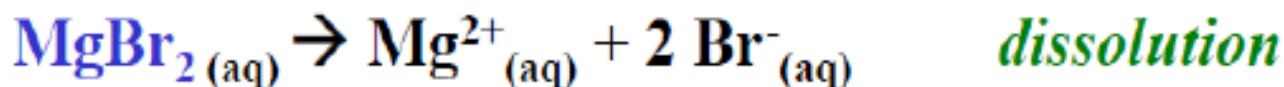
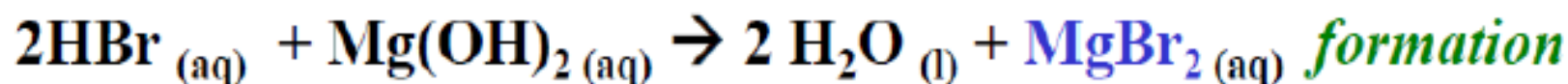
For example:



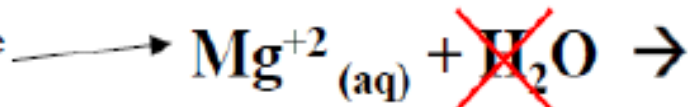
Salts That Produce Neutral Solutions

Salts of strong acids/strong bases

Example – solution of MgBr_2 , salt of strong acid + strong base

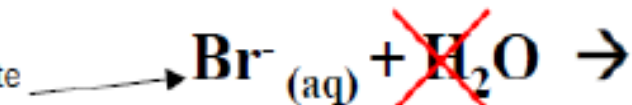


Weak conjugate
acid of strong
base



No *reaction*

Weak conjugate
base of strong
acid



No *reaction*

Weak conjugate acid and base do not hydrolyze (do not react with water) $\Rightarrow \text{pH} = 7$

Hydrolysis of Salts

Salts can be acidic, basic, or neutral.

1. Neutral Salts

Consider NaCl

The **neutralization equation** used to produce **NaCl** will tell us what kind of salt it is.



When the **acid** and **base** parents are both **strong** the salt is always **neutral**.

A neutral salt will dissociate in water.



Cross off the **both ions** that come from **strong parents** as they do not hydrolyze or react further with water- they are **neutral**.