

Types of Reactions

Aim

- group chemical changes into four basic types

Notes

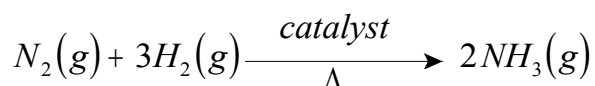
★ Direct combination (synthesis)

☆ General Pattern



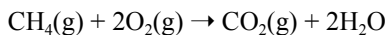
☆ Examples

- ★ Haber Process



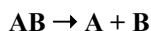
- ★ process for making ammonia
- ★ developed in 1913 by a German scientist Fritz Haber
- ★ Ammonia used for making fertilizer and explosives

- ★ Combustion

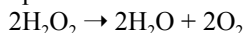


★ Decomposition

☆ General Pattern

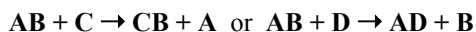


☆ Example



★ Single Replacement (substitution)

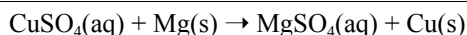
☆ General Pattern



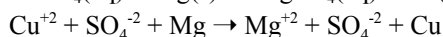
☆ Examples

- ★ Replacement of a metal by a more active metal

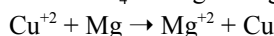
Molecular equation



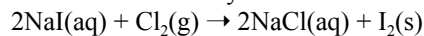
Ionic equation



Ionic equation omitting spectator ions

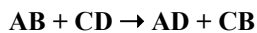


- ★ Replacement of a nonmetal by a more active nonmetal

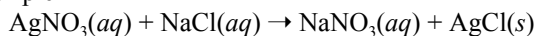


★ Double Replacement (Exchange of Ions)

☆ General Pattern



☆ Example



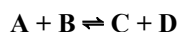
★ Reversible and end reactions

- ☆ End reaction - reaction in which the products are not available to react to form the initial reactants because

- ★ A precipitate forms
- ★ A gas forms
- ★ A liquid forms
- ★ A product is removed

- ☆ Reversible reaction - reaction in which the products remain available to react to form the initial reactants because

- ★ They remain aqueous



Answer the questions below by circling the number of the correct response

For each of the reactions described in questions 1-7, write the correct number to indicate whether the reaction type is (1) DECOMPOSITION, (2) DIRECT COMBINATION, (3) SINGLE REPLACEMENT, or (4) DOUBLE REPLACEMENT

1. A reaction occurs in which only one reactant is present.
2. A metal reacts with an acid. ($2\text{Fe} + 6\text{HCl} \rightarrow 2\text{FeCl}_3 + 3\text{H}_2$)
3. Magnesium burns.
4. Two salt solutions react with each other.
5. Two elements unite to form a compound.
6. A compound breaks down.
7. $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$

8. Many sulfide ores are prepared for refinement by roasting. This reaction can BEST be described as (1) decomposition, (2) direct combination, (3) single displacement, (4) double displacement.
9. During smelting, oxide ores are reduced to pure metals by reacting with (1) oxygen, (2) hydrogen, (3) carbon, (4) nitrogen.