

Chemical Reactions (Part 2) Worksheet

A compound is **soluble** in a particular liquid if it dissolves in that liquid.

A compound is **insoluble** if it does not dissolve in the liquid.

An **aqueous** solution is a homogeneous mixture of a substance with water.

1. Is each compound soluble or insoluble?

AgBr not soluble

CaCl₂ soluble

Pb(NO₃)₂ soluble

PbSO₄ not soluble

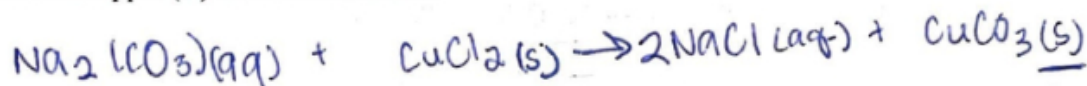
2. Write an equation for the precipitation reaction that occurs (if any) when solutions of sodium carbonate and copper (II) chloride are mixed.

2- Na - 1(2) = 2

1- CO - 1

1- Cu - 1

2- Cl - 1(2) = 2



solid is the precipitate

there is a reaction

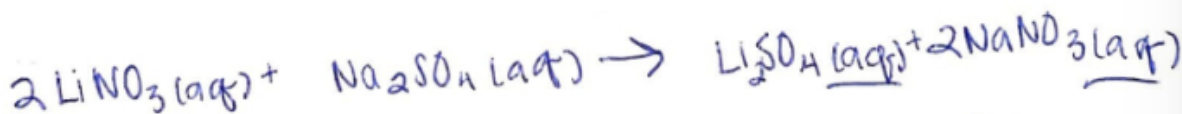
3. Write an equation for the precipitation reaction that occurs (if any) when solutions of lithium nitrate and sodium sulfate are mixed.

2(2) - Li - 2

2(2) - NO - 1(2) = 2

1- SO - 1

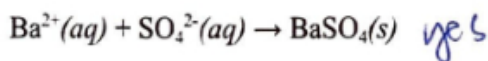
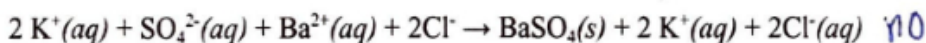
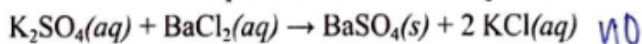
2- Na - 1(2) = 2



only aqueous, so there is no precipitate

there is no reaction

4. Which chemical equation is a net ionic equation?



4. What are the clues that a chemical reaction has occurred?

* 1) Color change

* 2) Precipitate formation

3) emission of light

* 4) formation of gas/odor

* 5) change of temperature/energy
(exo/endo)

8. List the different types of reactions and properties of each.

Single Replacement $A + BC \rightarrow B + AC$

Double Replacement $AB + CD \rightarrow AD + CB$

Synthesis $A + B \rightarrow AB$

Decomposition $AB \rightarrow A + B$

6. Which of these are redox reactions?

$2 \text{Mg}(s) + \text{O}_2(g) \rightarrow 2 \text{MgO}(s)$ yes - redox
synthesis

$2 \text{HBr}(aq) + \text{Ca}(\text{OH})_2(aq) \rightarrow 2 \text{H}_2\text{O}(l) + \text{CaBr}_2(aq)$ NO
double replacement

$\text{Ca}(s) + \text{Cl}_2(g) \rightarrow \text{CaCl}_2(s)$ yes - redox
synthesis

~~$\text{Zn}(s) + \text{Fe}^{2+}(aq) \rightarrow \text{Zn}^{2+}(aq) + \text{Fe}(s)$~~ yes - redox
 $2\text{H}_2\text{Fe}$
decomposition

Redox Reactions

- synthesis

- decomposition

- single replacement

- combustion

7. Write a balanced equation for the combustion of liquid methyl alcohol (CH_3OH).



$$2 = (2)1 - \text{C} - 1(2) = 2$$

$$8 = (2)4 - \text{H} - 2(2)4(4) = 8$$

$$6 = 2(2) + 4 = (2)3 - \text{O} - 3(2)4(4) = 6$$

$$\begin{array}{c} \text{CO}_2 \\ \text{H}_2\text{O} \end{array}$$

Oxidation Reduction Worksheet Answers

- $$\text{Mg}^0 + 2\text{H}^{+1} \text{Cl}^{-1} \rightarrow \text{Mg}^{+1} \text{Cl}_2^{-1} + \text{H}_2^0$$

Mg is oxidized (RA); H is reduced (OA); 2 electrons transferred
- $$2\text{Fe}^0 + 3\text{V}_2\text{O}_3^{+3-2} \rightarrow \text{Fe}_2\text{O}_3^{+2-2} + 6\text{VO}$$

Fe is oxidized (RA); V is reduced (OA); 6 electrons transferred
- $$2\text{KMnO}_4^{+1+7-2} + 5\text{KNO}_2^{+1+3-2} + 3\text{H}_2\text{SO}_4^{+1+6-2} \rightarrow 2\text{MnSO}_4^{+2+6-2} + 3\text{H}_2\text{O}^{+1-2} + 5\text{KNO}_3^{+1+5-2} + \text{K}_2\text{SO}_4^{+1+6-2}$$

N is oxidized (RA); Mg is reduced (OA); 10 electrons transferred
- $$\text{K}_2\text{Cr}_2\text{O}_7^{+1+6-2} + 3\text{SnCl}_2^{+2-1} + 14\text{HCl}^{+1-1} \rightarrow 2\text{CrCl}_3^{+3-1} + 3\text{SnCl}_4^{+4-1} + 2\text{KCl}^{+1-1} + 7\text{H}_2\text{O}^{+1-2}$$

Sn is oxidized (RA); Cr is reduced (OA); 6 electrons transferred
- $$2\text{KMnO}_4^{+1+7-2} + 10\text{NaCl}^{+1-1} + 8\text{H}_2\text{SO}_4^{+1+6-2} \rightarrow 5\text{Cl}_2^0 + \text{K}_2\text{SO}_4^{+2+6-2} + 2\text{MnSO}_4^{+1-2} + 8\text{H}_2\text{O}^{+1+6-2} + 5\text{Na}_2\text{SO}_4$$

Cl is oxidized (RA); Mn is reduced (OA); 10 electrons transferred
- $$2\text{K}_2\text{Cr}_2\text{O}_7^{+1+6-2} + 2\text{H}_2\text{O}^{+1-2} + 3\text{S}^0 \rightarrow 3\text{SO}_2^{4-2} + 4\text{KOH}^{+1-2+1} + 2\text{Cr}_2\text{O}_3^{+3-2}$$

S is oxidized (RA); Cr is reduced (OA); 12 electrons transferred
- $$8\text{KClO}_3^{+1+5-2} + \text{C}_{12}\text{H}_{22}\text{O}_{11}^0 \rightarrow 8\text{KCl}^{+1-1} + 11\text{H}_2\text{O}^{+1-2} + 12\text{CO}_2^{+4-2}$$

C is oxidized (RA); Cl is reduced (OA); 48 electrons transferred
- $$3\text{H}_2\text{C}_2\text{O}_4^{+1+3-2} + 2\text{K}_2\text{MnO}_4^{+1+6-2} \rightarrow 6\text{CO}_2^{+4-2} + 2\text{K}_2\text{O}^{+1-2} + \text{Mn}_2\text{O}_3^{+3-2} + 3\text{H}_2\text{O}^{+1-2}$$

C is oxidized (RA); Mn is reduced (OA); 6 electrons transferred
- $$2\text{Mn}(\text{NO}_3)_2^{+2+5-2} + 5\text{NaBiO}_3^{+1+5-2} + 16\text{HNO}_3^{+1+5-2} \rightarrow 2\text{HMnO}_4^{+1+7-2} + 5\text{Bi}(\text{NO}_3)_3^{+3+5-2} + 5\text{NaNO}_3^{+1+5-2} + 7\text{H}_2\text{O}^{+1-2}$$

Mn is oxidized (RA); Bi is reduced (OA); 10 electrons transferred
- $$4\text{H}_2\text{C}_2\text{O}_4^{+1+3-2} + 2\text{KMnO}_4^{+1+7-2} \rightarrow 8\text{CO}_2^{+4-2} + \text{K}_2\text{O}^{+1-2} + \text{Mn}_2\text{O}_3^{+3-2} + 4\text{H}_2\text{O}^{+1-2}$$

C is oxidized (RA); Mn is reduced (OA); 8 electrons transferred