

#### 4. Single Replacement Reactions

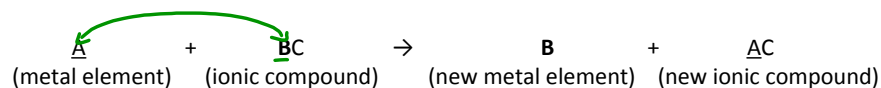
- A reactive element reacts with an ionic compound

- There are two types of Single replacement reactions

- Type 1 – metallic element reacts with an ionic compound
- Type 2 – non-metallic element reacts with an ionic compound

**Type 1** – metallic element reacts with an ionic compound

- In this type, the metal element becomes the cation in the compound, and the anion becomes the metal element.

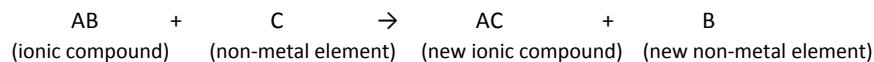


**Word equation:** Magnesium metal is placed in a solution of aqueous silver nitrate. Magnesium nitrate and solid silver are produced as a result of this chemical reaction.

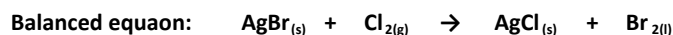
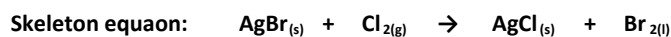


**Type 2** – non-metallic element reacts with ionic compound

- In this type, the non-metal element becomes the anion in the new compound, and the anion in the original compound becomes the non-metal element in the products.



**Word equation:** Solid silver bromide reacts with chlorine gas to produce solid silver chloride and liquid bromine



**Example 1: aqueous copper (II) nitrate reacts with solid zinc.**

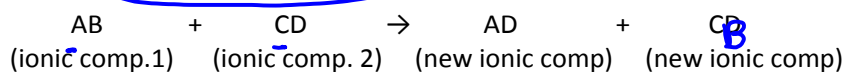
**Example 2: aqueous lithium bromide reacts with fluorine gas.**

## 5. Double Replacement Reactions

- Occurs most commonly between **two ionic compounds**. These ionic compounds are usually dissolved in water (aq).

- Sometimes, one of the products will form a **precipitate** as a result of this reaction.

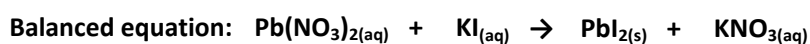
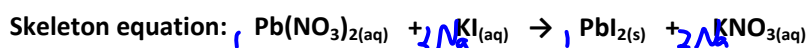
- The cations switch places.



sol. product

metal ions or  $\text{NH}_4^+$

**Word equation: Aqueous lead(II) nitrate reacts with aqueous potassium iodide to form solid lead (II) iodide and aqueous potassium nitrate**



**Practice:** Predict the products for the following double replacement reaction. Write the skeleton reaction first. Finally, balance the equations. \*\*\*Include the states\*\*\*

Aqueous copper(I) nitrate and aqueous potassium bromide are mixed. Complete the reaction and balance the equation.

Aqueous sodium chloride and aqueous silver nitrate are mixed together. Complete the reaction and balance the equation.

