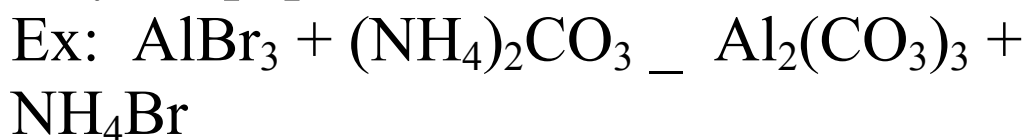


Chemistry

Rules for Balancing Chemical Equations

1. Write the equation to be balanced on your paper:



2. Next, say the word equation to yourself:

Ex: Aluminum Bromide + Ammonium Carbonate → Aluminum Carbonate + Ammonium Bromide

3. Identify any polyatomic ions in the equation. Ex:

- Ammonium = NH_4
- Carbonate = CO_3

4. Then, separate the positive (or in covalent compounds more positive) and negative (or in covalent compounds more negative) parts of each reactant and product. Write these below the equation:

AlBr_3	+	$(\text{NH}_4)_2\text{CO}_3$	_	$\text{Al}_2(\text{CO}_3)_3$	+	NH_4Br
Al		NH_4		Al		NH_4
Br		CO_3		CO_3		Br

5. Then, write numbers that show how many units of **reactants** and **products** there are:

AlBr_3	+	$(\text{NH}_4)_2\text{CO}_3$	_	$\text{Al}_2(\text{CO}_3)_3$	+	NH_4Br
1Al		2 NH_4		2Al		1 NH_4
3Br		1 CO_3		3 CO_3		1Br

6. Then, circle or **highlight** the reactants and products that do not match:

AlBr_3	+	$(\text{NH}_4)_2\text{CO}_3$	_	$\text{Al}_2(\text{CO}_3)_3$	+	NH_4Br
1Al		2 NH_4		2Al		1 NH_4
3Br		1 CO_3		3 CO_3		1Br

7. Next, follow this simple rule to change the **coefficients** of reactants and products in the correct order. Balance:

- **Metals** (or things that behave like metals), then

- **Nonmetals** (or things that behave like nonmetals), then
- **Hydrogen**, then
- **Oxygen**

8. So, in the reaction above, first we balance **Aluminum** by adding a **coefficient**. Notice that this changes the **number of units** of Al and Br on the reactants side:

2AlBr_3	+	$(\text{NH}_4)_2\text{CO}_3$	_	$\text{Al}_2(\text{CO}_3)_3$	+	NH_4Br
2Al		2NH_4		2Al		1NH_4
6Br		1CO_3		3CO_3		1Br

9. Next, we balance **Bromine** by adding a **coefficient**. Notice that this changes the **number of units** of NH_4 and Br on the products side:

2AlBr_3	+	$(\text{NH}_4)_2\text{CO}_3$	_	$\text{Al}_2(\text{CO}_3)_3$	+	$6\text{NH}_4\text{Br}$
2Al		2NH_4		2Al		6NH_4
6Br		1CO_3		3CO_3		6Br

10. Finally, we balance **Ammonium** and **Carbonate** by adding a **coefficient**.

Notice that this changes the **number of units** of NH_4 and CO_3 on the reactants side:

2AlBr_3	+	$3(\text{NH}_4)_2\text{CO}_3$	=	$\text{Al}_2(\text{CO}_3)_3$	+	$6\text{NH}_4\text{Br}$
2Al		6NH_4		2Al		6NH_4
6Br		3CO_3		3CO_3		6Br

11. Now, we have the same number each kind of atom on both sides of the equation, and thus conform to the **Law of Conservation of Mass**.

12. **We're done!! Yeah!!**