

8.1 Reactions and Equations



1. Review! Use your ions list to solve:

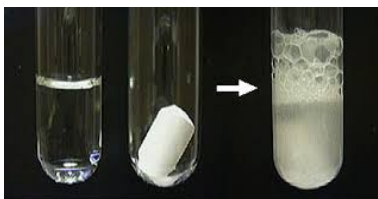
- A. Name this compound: $(\text{NH}_4)_3\text{PO}_4$
ammonium phosphate
- B. Name this compound: Li_2SO_4 lithium sulfate
- C. What is the formula of zinc sulfide? ZnS
- D. What is the formula of lead (II) chloride? PbCl_2
- E. What are the seven diatomic elements?
 $\text{H}_2, \text{N}_2, \text{O}_2, \text{F}_2, \text{Cl}_2, \text{Br}_2, \text{I}_2$.
- F. Name this compound: Cu_3AsO_4
copper (I) arsenate

Chemical Reaction

Chemical Change: when elements rearrange to make a different compound.

With a table partner, discuss one chemical reaction, and write it down.

How do you know it's a chemical reaction?



Evidence of Chemical Reaction

Indications that a chemical change may have occurred:

Temperature change:

Exothermic - releases heat
Endothermic - absorbs heat

Generation of gas (odor)

Generation of light



Color change

Formation of solid
 $\text{Cu}(\text{OH})_2$ Demo.



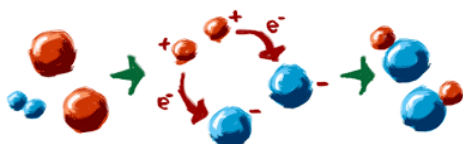
MRE in water demo

- mini Hindenberg (with water balloons on tubing).

Representing Chemical Reactions

Chemical equations show reactants forming products:

Reactant(s) \rightarrow Product(s)



Equation Symbols

Equations show states of matter:

Solids = (s) Ex: $\text{CaCl}_2(\text{s})$

Liquids = (l) Ex: $\text{H}_2\text{O}(\text{l})$

Gases = (g) Ex: $\text{H}_2(\text{g})$

Aqueous Solutions (dissolved in water) = (aq)

Ex: $\text{CuSO}_4(\text{aq})$



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3 Equation Types

1. Word Equation describes the reaction.

Ex: Aluminum metal and liquid bromine react, forming aluminum bromide.

2. Skeleton Equation lists formulas / states of matter of reactants and products (not balanced).

Ex: $\text{Al}_{(s)} + \text{Br}_{2(l)} \rightarrow \text{AlBr}_{3(s)}$

3. Balanced Equation shows correct amounts of reactants and products with coefficients.

Ex: $2\text{Al}_{(s)} + 3\text{Br}_{2(l)} \rightarrow 2\text{AlBr}_{3(s)}$

Coefficients

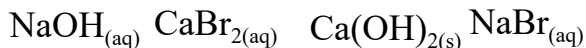
Balancing Equations Process:

1. Write skeleton equation.
2. Count atoms or polyatomic ions in reactants and products.
3. Change coefficients to make number of atoms/ions equal on both sides.
4. Write coefficients in lowest ratio.
5. Check your work – do atoms add up?

2. Word Example

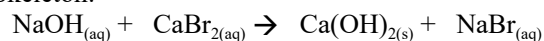
Aqueous solutions of **sodium hydroxide** and **calcium bromide** react, forming **solid calcium hydroxide** and **aqueous sodium bromide**.

Write the formulas of reactants and products, including states of matter, then make a skeleton equation:

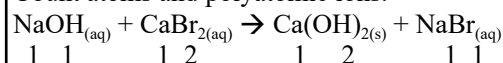


2. Word Example

Skeleton:

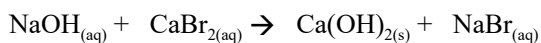


Count atoms and polyatomic ions.



Compare - where is there an imbalance?

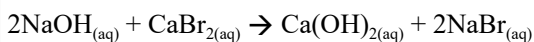
2. Word Example



Solution:

Put a 2 in front of NaBr to balance bromide.

Put a 2 in front of NaOH to balance hydroxide.



Does it check out?

3. Guided Example

Solid sodium metal reacts with oxygen forming solid sodium oxide.

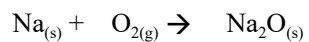
Determine the formulas and states of the compounds, then make a skeleton equation.



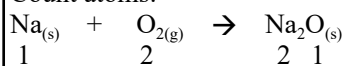
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3. Guided Example

Skeleton:

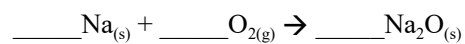


Count atoms:



Compare - where is there an imbalance?

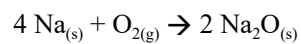
3. Guided Example



Solution:

Put a 2 in front of Na_2O to balance oxygen.

Put a 4 in front of Na to balance sodium.



Does it check out?

Homework

8.1 Booklet Problems.
Due next class.