

Chapter 8: Stoichiometry Review



Write balancing reactions with coefficients...

First write the decomposition with leading zeros.

1. When are the reactants more than the products?  $\text{Fe}_2\text{O}_3 \rightarrow 2\text{Fe} + \text{O}_2$
2. When are the products more than the reactants?  $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$
3. When are there equal numbers of reactants and products?  $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$
4. What is the coefficient in the balanced?  $2, 1, 2$
5. What does it tell us about the compound? It's made of 2 atoms of hydrogen and 1 atom of chlorine.

Then write the oxidation and reduction half reactions. The one with the higher oxidation state is the oxidation half reaction. The one with the lower oxidation state is the reduction half reaction.

Write your stoichiometry knowledge for the following chemical reactions.

- How many moles of...
- |   |  |
|---|--|
| 1. $\text{H}_2\text{SO}_4$ $\rightarrow$ 2 moles $\text{H}^+$ and 1 mole $\text{SO}_4^{2-}$ | 16. $\text{Fe}_2\text{O}_3$ $\rightarrow$ 2 moles $\text{Fe}$ and 1.5 moles $\text{O}_2$ |
| 2. $\text{CaCO}_3$ $\rightarrow$ 1 mole $\text{Ca}^{2+}$ and 1 mole $\text{CO}_3^{2-}$      | 17. $\text{H}_2\text{O}$ $\rightarrow$ 2 moles $\text{H}^+$ and 1 mole $\text{OH}^-$     |
| 3. $\text{MgCl}_2$ $\rightarrow$ 1 mole $\text{Mg}^{2+}$ and 2 moles $\text{Cl}^-$          | 18. $\text{Fe}_2\text{O}_3$ $\rightarrow$ 2 moles $\text{Fe}$ and 1.5 moles $\text{O}_2$ |

Write the formula for these:

- |   |  |
|---|--|
| 19. Lithium chloride $\rightarrow$ $\text{LiCl}$    | 21. Calcium hydroxide $\rightarrow$ $\text{Ca(OH)}_2$    |
| 20. Magnesium sulfate $\rightarrow$ $\text{MgSO}_4$ | 22. Barium nitrate $\rightarrow$ $\text{Ba(NO}_3)_2$     |
| 23. Sodium bromide $\rightarrow$ $\text{NaBr}$      | 24. Potassium permanganate $\rightarrow$ $\text{KMnO}_4$ |

Name: \_\_\_\_\_

Then write the balanced reaction:

19.  $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$  (also show the oxidation and reduction half reactions)
20.  $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$
21.  $\text{Ca(OH)}_2 + 2\text{HCl} \rightarrow \text{CaCl}_2 + 2\text{H}_2\text{O}$

How many moles of...

- |  |   |
|--|---|
| 19. $\text{Fe}_2\text{O}_3$ $\rightarrow$ 2 moles $\text{Fe}$ and 1.5 moles $\text{O}_2$ | 21. $\text{Ca(OH)}_2$ $\rightarrow$ 1 mole $\text{Ca}^{2+}$ and 2 moles $\text{OH}^-$     |
| 20. $\text{CaCO}_3$ $\rightarrow$ 1 mole $\text{Ca}^{2+}$ and 1 mole $\text{CO}_3^{2-}$  | 22. $\text{Ba(NO}_3)_2$ $\rightarrow$ 1 mole $\text{Ba}^{2+}$ and 2 moles $\text{NO}_3^-$ |
| 23. $\text{MgCl}_2$ $\rightarrow$ 1 mole $\text{Mg}^{2+}$ and 2 moles $\text{Cl}^-$      | 24. $\text{KMnO}_4$ $\rightarrow$ 1 mole $\text{K}^+$ and 1 mole $\text{MnO}_4^-$         |

Write the formula for these:

- |  |  |
|--|--|
| 25. Magnesium carbonate $\rightarrow$ $\text{MgCO}_3$    | 26. Calcium hydroxide $\rightarrow$ $\text{Ca(OH)}_2$    |
| 27. Sodium chloride $\rightarrow$ $\text{NaCl}$          | 28. Calcium sulfate $\rightarrow$ $\text{CaSO}_4$        |
| 29. Lead(II) nitrate $\rightarrow$ $\text{Pb(NO}_3)_2$   | 30. Nickel(II) hydroxide $\rightarrow$ $\text{Ni(OH)}_2$ |
| 31. Potassium permanganate $\rightarrow$ $\text{KMnO}_4$ | 32. Lithium chloride $\rightarrow$ $\text{LiCl}$         |

Name: \_\_\_\_\_

Then write the decomposition of water:

19.  $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$
20.  $\text{H}_2\text{O} \rightarrow \text{H}_2 + \frac{1}{2}\text{O}_2$
21.  $\text{H}_2\text{O} + \text{O}_2 \rightarrow \text{H}_2\text{O}_2$
22.  $\text{H}_2\text{O} + \text{H}_2\text{O} \rightarrow \text{H}_3\text{O}^+ + \text{OH}^-$