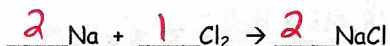


EXTRA PRACTICE: Limiting and Excess Reactants Practice #2

Name: _____

1. 50.0 grams of sodium metal reacts with 60.0 grams of chlorine to produce sodium chloride. What is the L.R. and E.R.?

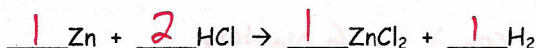


$$\frac{50.0 \text{ g Na}}{1} \times \frac{1 \text{ mol Na}}{22.99 \text{ g Na}} \times \frac{2 \text{ mol NaCl}}{2 \text{ mol Na}} \times \frac{58.44 \text{ g NaCl}}{1 \text{ mol NaCl}} = 127 \text{ g NaCl}$$

$$\frac{60.0 \text{ g Cl}_2}{1} \times \frac{1 \text{ mol Cl}_2}{70.9 \text{ g Cl}_2} \times \frac{2 \text{ mol NaCl}}{1 \text{ mol Cl}_2} \times \frac{58.44 \text{ g NaCl}}{1 \text{ mol NaCl}} = 98.9 \text{ g NaCl}$$

L.R. = Cl₂
E.R. = Na

2. In an S-R reaction, 50.0 grams of zinc reacts with 30.0 grams of hydrochloric acid (HCl) to produce zinc chloride. How many grams of zinc chloride are produced?



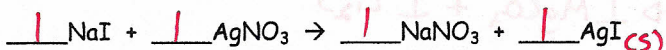
$$\textcircled{1} \frac{50.0 \text{ g Zn}}{1} \times \frac{1 \text{ mol Zn}}{65.39 \text{ g Zn}} \times \frac{1 \text{ mol ZnCl}_2}{1 \text{ mol Zn}} \times \frac{136.29 \text{ g ZnCl}_2}{1 \text{ mol ZnCl}_2} = 104 \text{ g ZnCl}_2$$

$$\frac{30.0 \text{ g HCl}}{1} \times \frac{1 \text{ mol HCl}}{36.458 \text{ g HCl}} \times \frac{1 \text{ mol ZnCl}_2}{2 \text{ mol HCl}} \times \frac{136.29 \text{ g ZnCl}_2}{1 \text{ mol ZnCl}_2} = 56.1 \text{ g ZnCl}_2$$

L.R. = HCl
E.R. = Zn

$\textcircled{2}$ **56.1 g ZnCl₂ Produced** → Theoretical Yield from L.R. = HCl

3. 40.0 grams of sodium iodide reacts with 50.0 grams of silver nitrate in a D-R reaction. How many grams of silver iodide is produced?



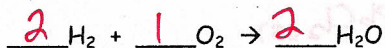
$$\textcircled{1} \frac{40.0 \text{ g NaI}}{1} \times \frac{1 \text{ mol NaI}}{149.89 \text{ g NaI}} \times \frac{1 \text{ mol AgI}}{1 \text{ mol NaI}} \times \frac{234.77 \text{ g AgI}}{1 \text{ mol AgI}} = 62.7 \text{ g AgI}$$

$$\frac{50.0 \text{ g AgNO}_3}{1} \times \frac{1 \text{ mol AgNO}_3}{169.91 \text{ g AgNO}_3} \times \frac{1 \text{ mol AgI}}{1 \text{ mol AgNO}_3} \times \frac{234.77 \text{ g AgI}}{1 \text{ mol AgI}} = 69.1 \text{ g AgI}$$

L.R. = NaI
E.R. = AgNO₃

$\textcircled{2}$ **62.7 g AgI Produced** → Theoretical Yield from L.R. = NaI

4. When 2.60 grams of hydrogen reacts with 10.2 grams of oxygen, water is produced. What is the L.R. and E.R.?

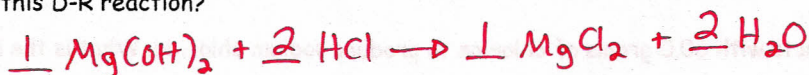


$$\frac{2.60 \text{ g H}_2}{1} \times \frac{1 \text{ mol H}_2}{2.016 \text{ g H}_2} \times \frac{2 \text{ mol H}_2\text{O}}{2 \text{ mol H}_2} \times \frac{18.016 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = 23.2 \text{ g H}_2\text{O}$$

$$\frac{10.2 \text{ g O}_2}{1} \times \frac{1 \text{ mol O}_2}{32.00 \text{ g O}_2} \times \frac{2 \text{ mol H}_2\text{O}}{1 \text{ mol O}_2} \times \frac{18.016 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = 11.5 \text{ g H}_2\text{O}$$

L.R. = O₂
E.R. = H₂

5. How many grams of water are produced if 50.6 grams of magnesium hydroxide and 45.0 grams of hydrochloric acid react in this D-R reaction?



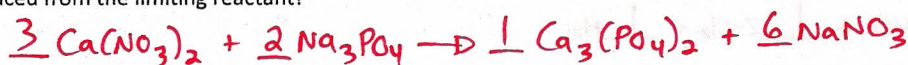
$$\textcircled{1} \frac{50.6 \text{ g Mg(OH)}_2}{1} \left| \frac{1 \text{ mol Mg(OH)}_2}{58.326 \text{ g Mg(OH)}_2} \right| \left| \frac{2 \text{ mol H}_2\text{O}}{1 \text{ mol Mg(OH)}_2} \right| \left| \frac{18.016 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} \right| = 31.3 \text{ g H}_2\text{O}$$

$$\frac{45.0 \text{ g HCl}}{1} \left| \frac{1 \text{ mol HCl}}{36.458 \text{ g HCl}} \right| \left| \frac{2 \text{ mol H}_2\text{O}}{2 \text{ mol HCl}} \right| \left| \frac{18.016 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} \right| = 22.2 \text{ g H}_2\text{O}$$

L.R. = HCl
E.R. = Mg(OH)₂

② **22.2 g H₂O Produced** → Theoretical Yield from L.R. = HCl

6. In a D-R reaction of 30.0 grams of calcium nitrate and 50.0 grams of sodium phosphate, how many grams of calcium phosphate are produced from the limiting reactant?



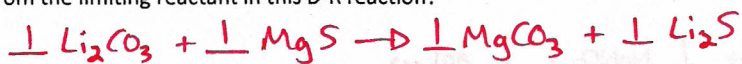
$$\textcircled{1} \frac{30.0 \text{ g Ca(NO}_3)_2}{1} \left| \frac{1 \text{ mol Ca(NO}_3)_2}{164.1 \text{ g Ca(NO}_3)_2} \right| \left| \frac{1 \text{ mol Ca}_3(\text{PO}_4)_2}{3 \text{ mol Ca(NO}_3)_2} \right| \left| \frac{310.18 \text{ g Ca}_3(\text{PO}_4)_2}{1 \text{ mol Ca}_3(\text{PO}_4)_2} \right| = 18.9 \text{ g Ca}_3(\text{PO}_4)_2$$

$$\frac{50.0 \text{ g Na}_3\text{PO}_4}{1} \left| \frac{1 \text{ mol Na}_3\text{PO}_4}{163.94 \text{ g Na}_3\text{PO}_4} \right| \left| \frac{1 \text{ mol Ca}_3(\text{PO}_4)_2}{1 \text{ mol Na}_3\text{PO}_4} \right| \left| \frac{310.18 \text{ g Ca}_3(\text{PO}_4)_2}{1 \text{ mol Ca}_3(\text{PO}_4)_2} \right| = 94.6 \text{ g Ca}_3(\text{PO}_4)_2$$

L.R. = Ca(NO₃)₂
E.R. = Na₃PO₄

② **18.9 g Ca₃(PO₄)₂ Produced** → Theoretical Yield from L.R. = Ca(NO₃)₂

7. If 100.0 grams of lithium carbonate reacts with 45.0 grams of magnesium sulfide, how many grams of magnesium carbonate are produced from the limiting reactant in this D-R reaction?



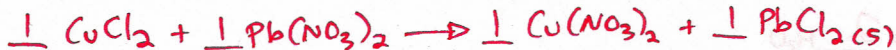
$$\textcircled{1} \frac{100 \text{ g Li}_2\text{CO}_3}{1} \left| \frac{1 \text{ mol Li}_2\text{CO}_3}{73.892 \text{ g Li}_2\text{CO}_3} \right| \left| \frac{1 \text{ mol MgCO}_3}{1 \text{ mol Li}_2\text{CO}_3} \right| \left| \frac{84.32 \text{ g MgCO}_3}{1 \text{ mol MgCO}_3} \right| = 114 \text{ g MgCO}_3$$

$$\frac{45.0 \text{ g MgS}}{1} \left| \frac{1 \text{ mol MgS}}{56.37 \text{ g MgS}} \right| \left| \frac{1 \text{ mol MgCO}_3}{1 \text{ mol MgS}} \right| \left| \frac{84.32 \text{ g MgCO}_3}{1 \text{ mol MgCO}_3} \right| = 67.3 \text{ g MgCO}_3$$

L.R. = MgS
E.R. = Li₂CO₃

② **67.3 g MgCO₃ Produced** → Theoretical Yield from L.R. = MgS

8. If 15.0 grams of copper (II) chloride react with 20.0 grams of lead (II) nitrate in this D-R reaction, what is the L.R. and E.R.?



$$\frac{15.0 \text{ g CuCl}_2}{1} \left| \frac{1 \text{ mol CuCl}_2}{134.45 \text{ g CuCl}_2} \right| \left| \frac{1 \text{ mol PbCl}_2}{1 \text{ mol CuCl}_2} \right| \left| \frac{278.1 \text{ g PbCl}_2}{1 \text{ mol PbCl}_2} \right| = 31.0 \text{ g PbCl}_2$$

$$\frac{20.0 \text{ g Pb(NO}_3)_2}{1} \left| \frac{1 \text{ mol Pb(NO}_3)_2}{331.22 \text{ g Pb(NO}_3)_2} \right| \left| \frac{1 \text{ mol PbCl}_2}{1 \text{ mol Pb(NO}_3)_2} \right| \left| \frac{278.1 \text{ g PbCl}_2}{1 \text{ mol PbCl}_2} \right| = 16.8 \text{ g PbCl}_2$$

L.R. = Pb(NO₃)₂
E.R. = CuCl₂