

**Mass-Mass Problems (and related topics such as mass→mol and mol→mol)**  
**from ChemTeam.com**

- 1)  $4 \text{FeCr}_2\text{O}_7 + 8 \text{K}_2\text{CO}_3 + \text{O}_2 \rightarrow 2 \text{Fe}_2\text{O}_3 + 8 \text{K}_2\text{CrO}_4 + 8 \text{CO}_2$ 
  - (a) How many grams of  $\text{FeCr}_2\text{O}_7$  are required to produce 44.0 g of  $\text{CO}_2$ ?
  - (b) How many grams of  $\text{O}_2$  are required to produce 100.0 g of  $\text{Fe}_2\text{O}_3$ ?
  - (c) If 300.0 g of  $\text{FeCr}_2\text{O}_7$  react, how many g of  $\text{O}_2$  will be consumed?
  - (d) How many g of  $\text{Fe}_2\text{O}_3$  will be produced from 300.0 g of  $\text{FeCr}_2\text{O}_7$ ?
  - (e) How many grams of  $\text{K}_2\text{CrO}_4$  are formed per gram (exactly 1 g) of  $\text{K}_2\text{CO}_3$  used?
  
- 2) Given the reaction  $\text{S} + \text{O}_2 \rightarrow \text{SO}_2$ 
  - (a) How many grams of sulfur must be burned to give 100.0 g of  $\text{SO}_2$ ?
  - (b) How many grams of oxygen will be required for the reaction in part (a)?
  
- 3)  $6 \text{NaOH} + 2 \text{Al} \rightarrow 2 \text{Na}_3\text{AlO}_3 + 3 \text{H}_2$ 
  - (a) How much aluminum, in grams, is required to produce 17.5 g of hydrogen?
  - (b) How much  $\text{Na}_3\text{AlO}_3$ , in g, can be formed from 165.0 g of sodium hydroxide?
  - (c) How many moles of  $\text{NaOH}$  are required to produce 3 g of hydrogen?
  - (d) How many mol of hydrogen can be prepared from 1 gram of aluminum?
  
- 4)  $\text{BaO} + \text{H}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + \text{H}_2\text{O}$ 
  - (a) How much  $\text{BaSO}_4$ , in g, can be formed from 196.0 g of  $\text{H}_2\text{SO}_4$ ?
  - (b) If 81.00 g of water is formed during this reaction, how much  $\text{BaO}$ , in g, was used?
  
- 5)  $\text{NaCl} + \text{AgNO}_3 \rightarrow \text{AgCl} + \text{NaNO}_3$ 
  - (a) 78.00 g of  $\text{NaCl}$  should produce how many grams of  $\text{AgCl}$ ?
  - (b) How much  $\text{AgCl}$ , in grams, can be produced from 107.0 g of  $\text{AgNO}_3$ ?
  
- 6)  $\text{B}_2\text{O}_3 + 3 \text{Mg} \rightarrow 3 \text{MgO} + 2\text{B}$ 
  - (a) How much boron, in grams, can be obtained from 10.00 grams of  $\text{B}_2\text{O}_3$ ?
  - (b) How much magnesium, in g, is required to produce 400.0 grams of boron?
  
- 7)  $\text{SnO}_2$  is reduced by carbon according to the this reaction:  $\text{SnO}_2 + \text{C} \rightarrow \text{Sn} + \text{CO}_2$ 
  - (a) How many grams of  $\text{CO}_2$  are formed when 1.00 gram of tin is produced?
  - (b) How much  $\text{SnO}_2$  (grams) is required to produce 6.00 grams of tin?
  - (c) How much tin (in grams) is produced per gram (exactly 1 gram) of carbon used?
  
- 8)  $2 \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{K}_2\text{SO}_4 + \text{Mn}_2\text{O}_7 + \text{H}_2\text{O}$ 
  - (a) How many moles of  $\text{Mn}_2\text{O}_7$  can be formed from 196.0 g of  $\text{KMnO}_4$ ?
  - (b) How many grams of  $\text{Mn}_2\text{O}_7$  can be formed from 390.0 g of  $\text{KMnO}_4$ ?
  - (c) How much  $\text{H}_2\text{SO}_4$  is needed to produce 27.00 g of water?
  
- 9) Determine moles of barium bromate [ $\text{Ba}(\text{BrO}_3)_2$ ] that can be prepared from 7.000 moles each of  $\text{HBrO}_3$  and  $\text{Ba}(\text{OH})_2$ , given this equation:  $2\text{HBrO}_3 + \text{Ba}(\text{OH})_2 \rightarrow \text{Ba}(\text{BrO}_3)_2 + 2\text{H}_2\text{O}$   
(Hint: calculate two separate answers.)
  
- 10) Determine moles of  $\text{Na}_2\text{S}$  that can be prepared by the reaction of 0.2240 moles of sodium with excess sulfur.  $16 \text{Na} + \text{S}_8 \rightarrow 8 \text{Na}_2\text{S}$