

Basic Competency Quiz #5

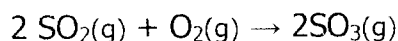
Chemistry, 7th ed., Zumdahl & Zumdahl, 2.8 + 5.1-5.6 + 6.1-6.2

Unless otherwise specified, each question is worth 5 points.

1. Complete the following table: (1 point each)

	Formula	Name
a.	CuCl	COPPER (I) CHLORIDE
b.	CuCl ₂	copper(II) chloride
c.	Fe(NO ₃) ₃	IRON (III) NITRATE
d.	Sn(SO ₄) ₂	tin(IV) sulfate
e.	CoPO ₄	COBALT (III) PHOSPHATE

2. If 10. liters of sulfur dioxide gas reacts with 5.0 liters of oxygen gas (as shown in the reaction, below), how many ~~moles~~ ^{LITERS} of sulfur trioxide gas will be produced? (Assume that the temperature and pressure remains constant.)



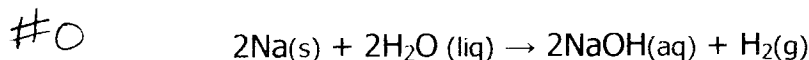
$$10. \text{L SO}_2 \times \frac{2 \text{ L SO}_3}{2 \text{ L SO}_2} = 10.0 \text{ L SO}_3$$

$$5.0 \text{ L O}_2 \times \frac{2 \text{ L SO}_3}{1 \text{ L O}_2} = 10.0 \text{ L SO}_3$$

$$10. \text{ L SO}_3(\text{g})$$

Unless otherwise specified, each question is worth 5 points.

3. When sodium reacts in water (as I described in class), it produces hydrogen gas. How many liters of hydrogen gas would be produced in lab @ 625 torr and 21°C if 1.00 g of sodium was dropped into a large beaker of water? The balanced redox reaction for this is:



$$\#1: 1.00\text{g Na} \times \frac{1\text{mol Na}}{22.99\text{g}} = 0.0435\text{ mol Na}$$

$$\#2: 0.0435\text{ mol Na} \times \frac{1\text{mol H}_2(\text{g})}{2\text{mol Na}} = 0.0217\text{ mol H}_2(\text{g})$$

$$\#3: \quad P = R \frac{T \times n}{V} \quad V = \frac{R \times T \times n}{P} \quad T = 21 + 273 = 294\text{K}$$

$$P = 625 \times \frac{1\text{atm}}{760\text{torr}} = 0.822\text{atm}$$

$$V = \frac{0.08206 \times 294 \times 0.0217}{0.822} = \boxed{0.637\text{ L}} \text{ H}_2(\text{g})$$

4. Calculate ΔE for each of the following gaseous systems: (2 points each)

- a. 500. J of work is done on a system and 500. J of heat is transferred from the system to the surroundings.

$$\Delta E = q + w = -500. + 500. = \boxed{0\text{ J}}$$

- b. 100. J of heat is transferred into a system and the system expands against external pressure which requires 250. J of work.

$$\Delta E = q + w = 100. - 250. = \boxed{-150\text{ J}}$$

