Thermochemistry Practice Name:_____

Determine if the reaction is endothermic or exothermic, the signs of ΔH and ΔS.

Reaction	Endo or Exo?	ΔH (positive or negative?)	ΔS (positive or negative?)
1. $H_2(g) + S(s) + 2O_2(g) \leftrightarrow H_2SO_4(l)$ $\Delta H = -811$ kJ			
2. $2C(s) + 2Fe_2O_3(s) + 464\text{ kJ} \leftrightarrow 4Fe(s) + 3CO_2(g)$			
3. $2H_2O(l) \leftrightarrow 2H_2(g) + O_2(g)$ $\Delta H = +572$ kJ			
4. $C(s) + 2H_2(g) \leftrightarrow CH_4(g) + 75$ kJ			

Problems: Use the reactions above to solve the following problems.

5. For reaction #1, how much heat is evolved when 5.63 of oxygen react?

6. For reaction #2, how many grams of CO_2 will be produced when 2.5×10^4 kJ of heat is applied?

7. For reaction #3, how much heat is needed to produce 10.1 L of H_2 gas at STP?

Solve the following problems.

8. 40.0 g of water is heated from 10.0°C to 30.0°C. The specific heat of water is 4.184 J/g°C. How much heat is involved during this process?

9. 229 joules of heat is needed to raise the temperature of 52 grams of nickel from 25°C to 35°C. What is the specific heat capacity of nickel?

10. How much heat is needed to vaporize 53.8 grams of lead? The heat of vaporization of lead is 178 kJ/mol.

11. 25.5 kJ of heat is needed to vaporize 6.0 grams of potassium. What is the heat of vaporization of potassium in kJ/mol?

12. Zinc has a specific heat capacity of 0.39 J/g°C. How much heat is needed to raise the temperature of 299 grams of zinc at 25°C to 45°C?