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**Worksheet 3**

1. For each of the following pairs of elements, indicate which has the higher ionization energy. Then explain your answer:
   1. Na or Rb
   2. Cl or I
   3. Fe or Cu
   4. Sb or I
2. For each of the following pairs of elements, indicate which has the larger radius. Explain your answer.
   1. Na or Rb
   2. Cl or I
   3. Fe or Cu
   4. Sb or I
3. For each of the molecules below, list the type of intermolecular forces, then explain which molecule would have the highest boiling point and why.
   1. CH4, C6H14, C6H13OH
4. A 30 gram piece of tungsten is set in the sun for three hours. While the tungsten started out at room temperature of 22 ⁰C, it soon increased its temperature to 120⁰C. How much energy did the tungsten absorb? (The specific heat of tungsten is 0.132 J/g 0C.) **(388 J)**
5. 13.5 grams of hydrogen is released into a 300 ml flask at standard temperature. What is the pressure inside the flask (in atmospheres)? **(504 atm)**
6. 25 grams of bromine is consumed in the reaction between NaCl and Br2. Determine the volume of chlorine gas produced at STP. **(3.58 L)**
7. Solve the following thermodynamic equation using Hess’ Law: H2S(g) + 3/2O2(g)🡪H2SO3(l)   
   **(-128.5 kJ)** ΔH =

H2O(l) +SO2(g)=>H2SO3(l) ΔH = -15.5 kJ

S(s) + O2(g)=>SO2(g) ΔH = -74.3 kJ

S(s) + H2O(l)=>H2S(g) + 1/2O2(g) ΔH = 38.7 kJ

1. Consider the equation: S (s) + O2 (g) → SO2 (g) ΔH = -296 kj/mole. Determine the energy produced if 19 grams of sulfur is reacted. Is this reaction exothermic or endothermic? **(-175.8 kJ)**