**SI WORKSHEET 14**

1. H2O(g)🡪 H2O(s) ⍙H= **-161.03 kJ**
   1. Is this process endo or exothermic? Exothermic
   2. How much energy is released/absorbed if 50 g of water is originally at 130oC and cools at -20oC (⍙Hfusion = 333 J/g and ⍙Hvaporation =2260 J/g). For this problem you will have to have 5 steps. Each step represents a change in enthalpy at a temperature or for a temperature range. The heat of vaporization and fusion come into play when a compound changes states. Sooo……

Q1= temperature change from 130oC-100oC= 50\*4.184\*(100-130)

Q2= phase change at 100oC= 50 \*-(⍙Hvaporization)\*negative because of gas🡪liquid

Q3=(⍙T from 100oC🡪0oC= 50\*4.184\*(0-100)

Q4=phase change at 0oC= 50\*-⍙Hfusion)\* because liquid🡪solid

Q5= =(⍙T from 0oC🡪-20oC = 50\*4.184\*(-20-0)

**Q1+q2+q3+q4+q5= qtotal= -161030 J🡪 -161.03 kJ = ⍙H**

1. 50g of Ethanol (C2H5OH) is heated from -20oC to its boiling point of 78oC. How much energy is released or absorbed in this process? (ethanol melts at -114oC and its heat of vaporization and heat of fusion are 38.6kJ and 4.9kJ, respectively.)(constant for specific heat=2.44)

Q1: (50)(2.44)(98)=11956

Q2: (50)(38600)=1930000

Q1+Q2= 1941956 J🡪1941.956 kJ

1. C4H10(g) +15/2 O2(g) 🡪 4CO2(g) + 5H2O(g) ⍙H=-2635.4 kJ
   1. What is ⍙H? [(4\*-393.5)+(5\*-241.8)]-[(-147.6)+ (15/2\*0)=
   2. What is ⍙H if only one mole of CO2 is formed? -658.85 kJ (divided total enthalpy by 4)
   3. If 100 grams Oxygen used? -1098.1 kJ
2. Target reaction: CaCO3 🡪 CaO + CO2  ⍙H=178.4 kJ
3. C + O2 🡪 CO2 ⍙H= -393.5 kJ
4. Ca + O2🡪 CaO ⍙H= -635.1 kJ
5. Ca + C + O2🡪 CaCO3 ⍙H= -1206.9 kJ \*reverse
6. Target reaction: C3H8 + O2 🡪 CO2 + H2O ⍙H=? 5-7 ON NEXT SI SHEET
   1. C(s) + H2 🡪 C3H8 ⍙H= -103.8 kJ
   2. H2 + O2 🡪 H2O (g) ⍙H= -241.8 kJ
   3. C + O2 🡪 CO2 ⍙H= -393.5 kJ
7. Sr + C + O2 🡪SrCO3(s) ⍙H=?
   1. Sr + O2 🡪SrO ⍙H= -592 kJ
   2. SrO + CO2 🡪 SrCO3 ⍙H= -234 kJ
   3. C + O2 🡪 CO2 ⍙H= -393.5 kJ
8. OF2 + H2O(g) 🡪HF(g) + O2 ⍙H=?
   1. The standard molar enthalpy of formation of OF2 is 18kJ/mol, calculate the standard molar enthalpy change for the reaction.