Faculty of sciences and technology
Department of engeneering process 3 nd worksheet for directed works
3 rd year students

Exercise 01 :

Given the reaction of diamond converting to graphite

2C(sdiamond)→2C(s(graphite)

Determine ΔG at 298 K and determine if this reaction is spontaneous or not. What does ΔG say about the rate of this reaction?

- ΔH°f(C(s)diamond) =1.9 kJ/mol
- S°(C(s)diamond =2.38 J/(molK)
- S°(C(s)graphite) =5.74 J/(molK)

Exercise 02 :

Given these reactions reactions, determine whether the ΔS increases or decreases or stays the same at 25 °C;

a. H2SO4(l,1atm)→H2SO4(s)(1atm)
b. H2O(l,1atm)→H2O(g,1atm)
c. CH4(g)+2O2(g)⇌CO2(g)+2H2O(l)

Exercise 03 :

Calculate ΔG°for

CS2(l)+2O2(g)→CO2(g)+2SO2(g)

using **only** the following ΔG values for the reaction:

- C(s)+O2(g)→CO2(g) with ΔGo=−394.39kJ/mol
- S(s)+O2(g)→SO2(g) with ΔGo=−300.13kJ/mol
- C(s)+2S(s)→CS2(l) with ΔGo=67.1kJ/mol

Exercise 04 :

The density of an aqueous solution of methyl alcohol, containing 60% alcohol by mass, is equal to 0.8946 g/cm3, while the partial molar volume of the water it contains is equal to 16.8 cm3 /mole.

Calculate the partial molar volume of the alcohol in this solution.

Use the flowing equation : $V = n_1 V_1 + n_2 V_2$