0602A: Thermodynamics of Energy Conversion

10/04/21: Practice HW on Gibbs Free Energy and Chemical Potential

1.

Write a narrative that distinguishes between Gibbs Free Energy and the Chemical Potential. How are they related?

2.

The general description of the chemical potential is given by

$$\mu_{specie} = \mu_{specie}^{o} + RT\ell n\left[a_{specie} \right] \tag{1}$$

Give a succinct definition of the three critical variables in the above equation.

What is a_{specie}? Give one example (for example pressure of a gas of a single composition).

3.

Prove that

$$\mu_{p_{O_2}}^{(2)} - \mu_{p_{O_2}}^{(1)} = RT\ell n\frac{p_2}{p_1} \tag{2}$$

Start by defining the variable in Eq. (2).