Q4001 Thermodynamics of Materials **September, 2019**
Homework 7

For this homework you have to describe the thermal stability of a carbonate and the produced oxide, i.e.

$$\begin{aligned} \mathbf{M}CO_3 &\rightarrow \mathbf{M}O + CO_2 \\ \mathbf{M}O &\rightarrow \mathbf{M} + \frac{1}{2} O_2 \end{aligned}$$

where **M**≡ Mg, Mn, Co, Fe or Zn.

Find the thermodynamic data to calculate and plot the values of $\Delta_{\text{rxn}}G$ as a function of temperature to dtermine:

a) The temperatures at which the reactions above are expected to occur spontaneously.

b) The phase transformations of the metal (and oxide) that may occur in the temperature range considered.

c) Calculate the partial pressures for CO_2 for the carbonate and of O_2 for the oxide at 25 °Plot the the partial pressures for CO_2 for the carbonate and of O_2 for the oxide as function of temperature. For this graph, plot $\ln P$ vs. $1/T$.

Due date: Tuestday, october 1st.