# ChemE 2200 - Physical Chemistry II for Engineers

## Quiz 8 - March 19, 2025

Name: *Solution*

There were four versions of this quiz.

1. Find the intersection of the line labeled "$Si + O_2 = SiO_2$" and the line labeled "$2C + O_2 = CO$" This is the point at which $\Delta G^0_{rxn} = 0$ for the reaction $SiO_2(s) + 2C(s) \leftrightarrow Si(s) + 2CO(g)$. This point is at approximately 1530°C.

2. Find the intersection of the line labeled "$2Ti + O_2 = 2TiO$" and the line labeled "$2C + O_2 = CO$" This is the point at which $\Delta G^0_{rxn} = 0$ for the reaction $TiO(s) + 2C(s) \leftrightarrow Ti(s) + 2CO(g)$. This point is at approximately 2050°C.

3. Find the intersection of the line labeled "$(4/3)Cr + O_2 = (2/3)Cr_2O_3$" and the line labeled "$2C + O_2 = CO$" This is the point at which $\Delta G^0_{rxn} = 0$ for the reaction $(2/3)Cr_2O_3(s) + 2C(s) \leftrightarrow (4/3)Cr + 2CO(g)$. This point is at approximately 1240°C.

4. Find the intersection of the line labeled "$(4/3)Cr + O_2 = (2/3)Cr_2O_3$" and the line labeled "$C + O_2 = CO_2$" This is the point at which $\Delta G^0_{rxn} = 0$ for the reaction $(2/3)Cr_2O_3(s) + C(s) \leftrightarrow (4/3)Cr + CO_2(g)$. This point is at approximately 1710°C.

Grading Rubric:

→ Correctly identified point: +5

→ Correct number for point used to identify T (not necessarily correct point):
- +3 within ±50°C of answer
- +5 within ±30°C of answer