

GG425 -- ENVIRONMENTAL GEOCHEMISTRY
(Due in class, Fri 15 Feb)

HW #2

A. Redox

Chapter 4 problems 1, 2, 6, 8, 15

some notes:

problem 2. This is a solubility problem: With CO_2 present in solution at low pE and basic pH, which material is less soluble, $\text{Fe}(\text{OH})_2$ or FeCO_3 . The least soluble phase will "dominate" the solids (be more abundant) at the conditions specified.

Problem 6.

One can estimate pH and pE by reading off Fig. 4.4 the x and y axis values at the "triple" point intersection of the stability files for Fe^{2+} , $\text{Fe}(\text{OH})_2$, and $\text{Fe}(\text{OH})_3$. From this one gets pH~9 and pE~5. But these are only approximate values. I would like you instead to solve for these values, as well as $[\text{Fe}^{+3}]$, algebraically, by setting up 3 equations to solve for 3 unknowns. The equations will be chemical reactions that define the lines in the pe-pH diagram.

Problem 8. Similar to problem 6, but you are solving for only one unknown.

B. Aquatic Microbial Geochemistry

Chapter 6 problems: 1, 10, 15, 18, 21