Alternative Activity 3.1

Description

In this activity the students will perform an equilibrium analysis on a system that includes a solid.

Objective

The objective is to help the students realize that the procedural steps introduced in the reading and video may need to be modified in some cases, and to illustrate one such case.

Preparation

1. This activity should be conducted using one of the "Generic Lesson Plans for Problem-Solving Learning Activities." Those plans should be downloaded from the KaRE TExT site, and the particular variant to be used should be selected.
2. The students should be told to bring the KaRE TExT handout with the problem statement when they come to class.

Lesson Plan

1. Follow one of the generic lesson plans above. At the end of the activity, you may wish to emphasize these points:
   a. The activity of a solid is normally taken to equal 1. When doing equilibrium conversion calculations involving solids, you may not get a physically meaningful result, and this indicates that the reaction does not occur at the specified conditions.
   b. In this problem, they were given the free energies of formation at 1073 K instead of at 298 K. As a consequence, they did not need to generate an expression for the heat of reaction and integrate it. Equation (4) could be used directly. Usually this isn't possible because free energy of the reaction is not known at the desired temperature, but only at 298 K.

Tips and Suggestions

A point that is likely to cause problems for the students is expressing the activity of the solid in terms of composition. Explain to them that a solid isn't like a gas or liquid where the composition can vary, but that either it is there or it isn't. Also, by assigning an activity of one to it, they have implicitly assumed that it is present.