
OVERVIEW

This laboratory involves using graphics to visualize natural phenomena or scientific concepts.

Choose ONE of the two following tasks for your laboratory assignment.

TASKS

Option 1: Regular Solution Model

The molar free energy of mixing is often approximated by the regular solution model for ΔG^{mix}

$$\Delta G^{\text{mix}}(X, T; \alpha) = \alpha X(1 - X) + RT[X \log X + (1 - X) \log(1 - x)]$$

where X is the molar composition ($0 < X < 1$) of a binary solution, R is the gas constant, T is temperature α is a parameter that indicates the molar heat of mixing: when $\alpha > 0$ heat is expelled upon mixing at constant T and when $\alpha < 0$ heat is absorbed upon mixing at constant T .

1. Using graphics, visualize the behavior of the regular solution molar free energy of mixing. You will want to illustrate how the molar free energy of mixing depends on temperature and on the parameter α .
2. (Extra Credit) Use the regular solution molar free energy of mixing and create a visualization of how a phase diagram is constructed.

Option 2: Creative Visualization Pick any natural phenomenon or any scientific or engineering concept and create a visualization of it. Your result should be instructive to the viewer and use graphics to convey an idea.

Save your Work Save your work as a Mathematica notebook: 3016_Lastname_Lab06.nb.

REPORT

This homework will be graded. Your report on the work above should be ordered as it is above. Your report should include comments that would help one of your classmates understand what your work demonstrates. Send your report as a saved Mathematica notebook with name 3016_Lastname_Lab06.nb to 3.016@pruffle.mit.edu.