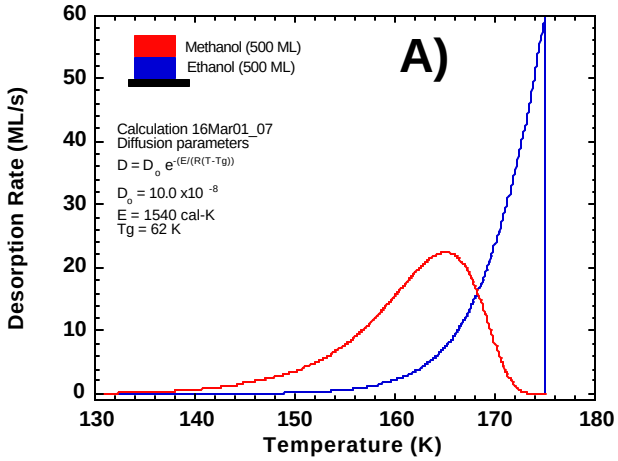
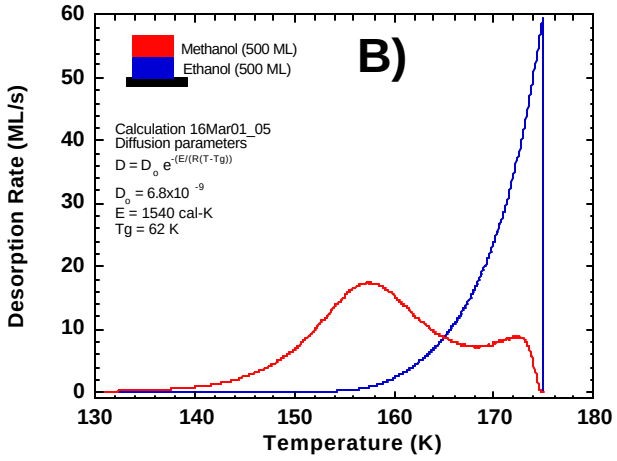
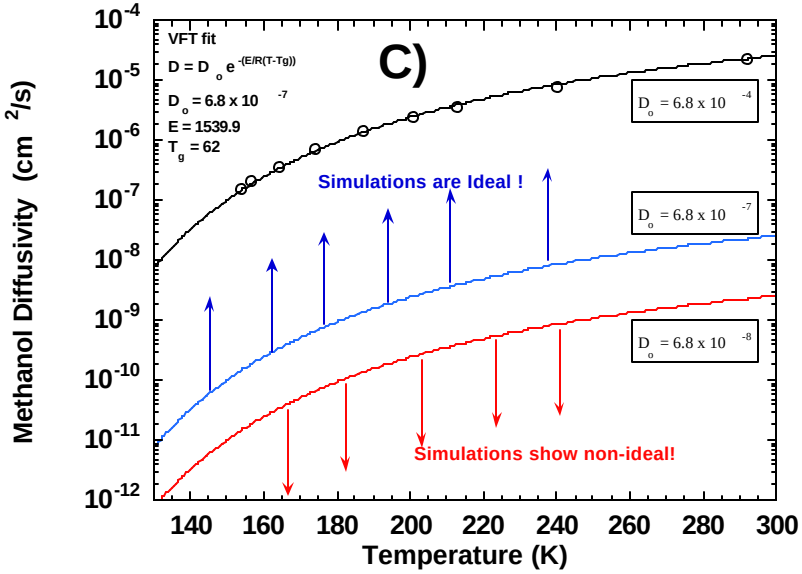
Pilot-CSD1 Highlight

Project: Dynamic Processes in Metastable Materials

EMSL







Ideal Solution Model for Desorption from Low Temperature Mixtures

The relatively large diffusivities exhibited by amorphous deposits of water, methanol and ethanol at cryogenic temperature (<160K) opens up the possibility to investigate liquid-phase kinetics in the deeply-supercooled, metastable, thin film regime. The desorption spectra of binary mixtures can exhibit complex features that depend strongly on both the film composition and thickness. Analysis of the desorption spectra using a kinetic model that describes liquid solution evaporation reveals both the extent of mixing and the details of the solvation kinetics in the metastable liquids. Deviations from ideal solution behavior should be apparent from the phase diagram and we should be able to calculate activities and phase diagrams for these complex liquid solutions.

In these calculations we were trying to determine the diffusion rates needed to intermix amorphous thin films. Plot A) and B) show calculations were the films Intermix and don't Intermix respectively. Plot C) shows the values of the diffusivites where the calculations showed ideal solution behavior and where they do not.

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