

# Excess thermodynamic functions of alcohols + alkane mixtures

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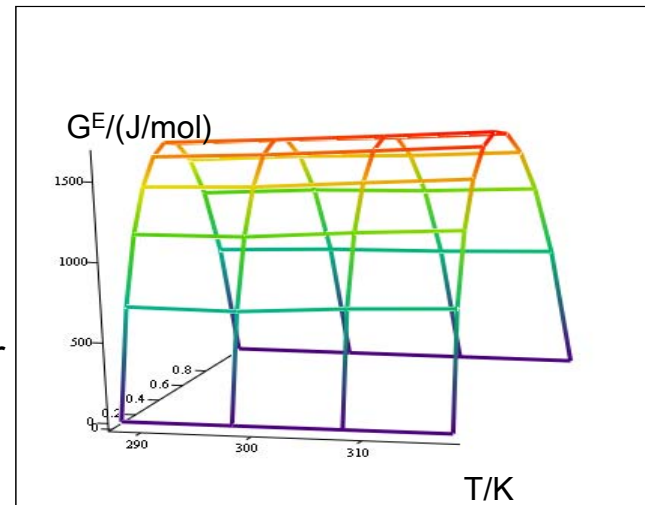
## Research Experiences for Undergraduates

The goal of this project is to study binary liquid mixtures of alcohols+alkane as functions of temperature and composition to seek trends due to intermolecular interactions.

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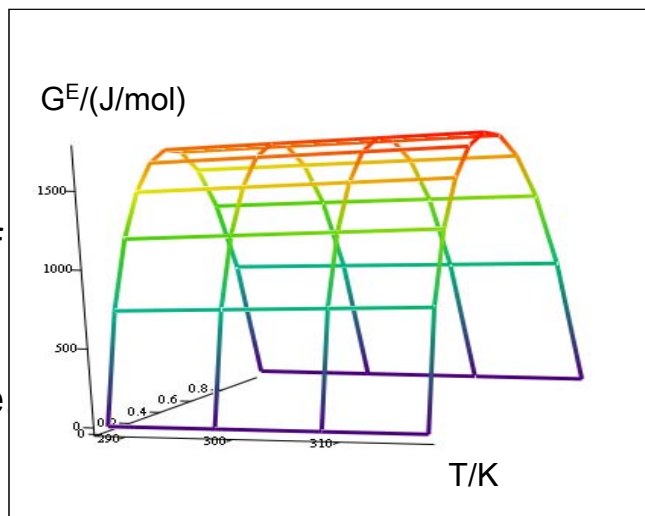
measured  $V^E$ ,  $G^E$ , and viscosity deviations for mixtures hexanol + nonane, cyclohexanol + nonane, hexanol + octane, and cyclohexanol + octane. The figures show the trends in  $G^E(X, T)$  for  $T=288\text{K}$  to  $328\text{K}$ .  $G^E$  is  $\geq 0$  for all mixtures. Though the data are fit to sixth-order Redlich-Kister polynomials, the curves are essentially parabolic and could be fit by a first order Redlich-Kister polynomials, that is  $G^E=X(1-X)A$ . The lattice model for binary liquid mixtures requires only one intermolecular interaction parameter. That  $G^E$  can be fit with only one parameter  $A$  suggests, in agreement with the one parameter lattice model, only one intermolecular interaction is necessary to explain  $G^E$  in these mixtures. Hexanol+nonane show higher  $G^E$  due to shape of alcohols. By comparing cyclohexanol+nonane and cyclohexanol+octane,  $G^E$  increase with chain length. This relationship is also found in hexanol+octane and hexanol+nonane

Excess Gibbs Potential of cyclohexanol+nonane



(Temp, X, GE)

Excess Gibbs Potential of hexanol+nonane



(Temp, X, GE)