Chemistry Seminar Series
Spring 2014

Time: 12:30-2:00 PM

Place: Science Hall West 301

When: Thursday, March 27th, 2014

Dr. Michael A. Rogers

PROFESSOR

Department of Food Science

Rutgers University

Probing Solubility Parameters Governing Self-Assembly of Molecular Gels

Aside from the overview of each treatment several new and extremely exciting conclusions could be drawn, for the first time, from solvent parameters regarding the mechanism of self-assembly of 1,3:2,4-Dibenzylidene Sorbitol (DBS). In the case of DBS, analyses of the data using the solvatochromic parameters derived by Kamlet and Taft and by Catalan et al. strongly suggest that although polarity of a solvent is important, its ability to accept or donate a hydrogen bond is much more consequential to determining whether addition of DBS will result in a solution, a clear gel or an opaque gel. The thermodynamically derived parameters must be separated into individual Hansen solubility parameters to be sensitive to the mechanism of self-assembly where DBS is more sensitive to the hydrogen-bonding HSP component than to the polar and dispersive HSP components. Unlike polymers, which are very sensitive to the distance in Hansen space between their HSP and that of a solvent, but much less so to the vector connecting the two points, the phases of the DBS-solvent systems are sensitive to both. This observation is consistent with conclusions derived from solvatochromic-based measurements. The Flory-Huggins parameter is also extremely efficient at clustering the different DBS solution and gel states. Finally, component analysis, may allow commonly available measures of solvent polarity that are individually ineffective at predicting self-assembly of molecular gel formation, to be combined accurately.