610b Phase Behavior and Polymerization of Bicontinuous Divinylbenzene/Sugar Microemulsion Glasses

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Mixtures of water, oil and surfactant exhibit a variety of self-assembled microstructures that have been extensively used as templates for nanomaterials synthesis. However, because these template microstructures are labile, and the structural rearrangements typically occur on a faster time scale than most templating reactions, the structures of the final materials are seldom a direct complementary replica of the template. In this talk, we will present the phase behavior and polymerization of a new class of anhydrous sugar-based bicontinuous microemulsions comprising of glassy sugars, glucoside surfactants, and divinylbenzene monomer. Polymerization of the liquid divinylbenzene monomer within the interstices of the microemulsion glass structure, followed by dissolution of the sugar-glass template allows replication of the bicontinuous structure without phase separation as confirmed by optical, electron, and surface-probe microscopy.