



Molecular Crystals and Liquid Crystals Incorporating Nonlinear Optics

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Polymeric Precursors for Inorganic Materials

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Standard ceramic processing centers around the growth, compaction, and sintering of compact colloidal particles. Recently, however, it has become clear that numerous glass and ceramic processing techniques cannot be understood in terms of standard colloid physics. The purpose of this talk is to demonstrate several areas where polymer concepts are not only necessary for the understanding of ceramic processing, but also provide the insights necessary to tailor the properties of ceramic materials to achieve specific goals. The talk will center on the polymerization of silicates in solution. By control of the growth conditions such as catalysis, pH, and reaction sequence, it is possible to create a variety of structures from dense colloidal particles to randomly branched polymers. By mapping the polymerization process onto simple fractal models, it is possible to identify the essential factors that control the structure.

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