



Molecular Crystals and Liquid Crystals

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Macroscopic Phenomena in Polymer Liquid Crystals

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MACROSCOPIC PHENOMENA IN POLYMER LIQUID CRYSTALS

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Abstract. Rigid and semirigid backbone polymers based on either helical structures or conjugated aromatic bonding often exhibit nematic ordering in solution or as melts. Because of the large axial ratio of these molecules, the resulting nematic phases exhibit highly anisotropic elastic and viscous properties. The study of macroscopic phenomena in these liquid crystals serves two purposes. First is the elucidation of the relationship between macroscopic material parameters and molecular properties. Second is the understanding of the consequence of the highly anisotropic nature of these materials, namely new phenomena not observed in low molecular weight liquid crystals. Several new phenomena will be described related to the Frederiks transition and flow instabilities.