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Prediction of flow-aligning and tumbling in a bent-core nematic liquid crystal using measurements of orienation order parameters MIN SANG PARK, School of Polymer, Textile and Fiber Engineering, Georgia Institute of Technology, BEOM-JIN YOON, JUNG OK PARK, MOHAN SRINIVASARAO, School of Polymer, Textile, and Fiber Engineering, Georgia Institute of Technology, Georgia Institute of Technology — The flow behavior of bent-core nematic liquid crystal (A131), which has been known to exhibit a biaxial nematic phase, is predicted by measurements of 2^{nd} and 4^{th} rank orientation order parameters. Using experimentally determined uniaxial, $<P_{200}>$ and $<P_{400}>$, and biaxial orientation order parameters, $<P_{220}>$, $<P_{420}>$ and $<P_{440}>$ from polarized micro-Raman spectroscopy, we compute the tumbling parameter, λ. The relationships between the order parameters and tumbling parameter derived by 2 different groups are used and the results are computed: a molecular theory by Archer and Larson (1995), that by Kroger and Seller (1995) for uniaxial system, and Leslie's theory for 2-director continuum. Temperature evolution of tumbling parameter shows the transition from a flow alignment regime to a tumbling instability. The results of the temperature evolution of tumbling parameter of bent-core nematic LC are compared to those of pure nematic LC (5CB) and LC mixture (E7).

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