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Orientational fluctuation study in nematic liquid crystals by high speed micrograph BEOM-JIN YOON, MIN SANG PARK, School of Polymer, Textile, and Fiber Engineering, Georgia Institute of Technology, JUNG O. PARK, School of Polymer, Textile, and Fiber Engineering, Center for Advanced Research on Optical Microscopy, Georgia Institute of Technology, MOHAN SRINIVASARAO[1], School of Polymer, Textile, and Fiber Engineering, School of Chemistry and Biochemistry, Center for Advanced Research on Optical Microscopy — The orientational fluctuations in uniaxial and biaxial nematic liquid crystals were investigated with a polarized microscope and a high speed TV camera. Liquid crystals usually have fluctuations with respect to their director, even when the molecular axes tend to be aligned to each other. These fluctuations are sufficiently slow and large, have long wave length and increase with temperature. Herein, we describe our study on fluctuation dynamics by direct observations in real space, while it has been typically done by the photon scattering in reciprocal space. The twinkling of liquid crystals due to orientational fluctuations was observed with a high speed camera up to 500 frames/sec. The time correlation function of the intensity was computed via 2D spatial Fourier transform of each image and then the relaxation frequency was estimated from it. The elastic constant to the viscosity ratio was computed from the relaxation frequency. This approach provides facile route to analyze fluctuation dynamics in liquid crystals.

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