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Deformations in chiral liquid crystals PETR SHIBAEV, KATHRYN REDDY, DANIEL BATEMAN, Fordham University, Department of Physics, ANDREY ILJIN, Institute of Physics, Ukraine — Deformations and their relaxation in chiral liquid crystals are studied experimentally and theoretically in planar geometry for liquid crystalline mixtures of varying viscosities. It is shown by both methods that shear deformation in liquid crystals results in the inclination and extension of cholesteric helix in samples with high viscosity [1,2]. Stretching deformation results in shrinking cholesteric helix. This leads to a possibility of detecting deformations on a nanometer scale by observing changes in selective reflection spectra. Theoretical model takes into account elastic strain of physical network formed by the entanglements between components of liquid crystalline mixture, viscosity of the matrix and elasticity of the liquid crystalline subsystem. This allows to model mechanical response of the matrix with different viscosities to stretching and shear of various amplitudes. It is shown that relaxation of the cholesteric helix takes much shorter time than mechanical relaxation of the mixtures. The model perfectly agrees with experimental data. The model is compared with theoretical model describing behavior of elastomers.

[1] P.V. Shibaev, L. Newman, *Liquid Crystals*, 40, 428 (2013);
[2] P.V. Shibaev,C. Schlesier, *Applied Physics Letters, 101, 193503 (2012)*

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