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New methodology for rheological properties calculation of discotic nematic Liquid Crystals[1] DANA GRECOV, ARASH NIKZAD, University of British Columbia, ABOZAR AKBARI, Monash University — In this study, the main objective is to propose a methodology to calculate various rheological properties and viscosity coefficients for a discotic nematic LiquidCcrystal (DNLC). Liquid Crystals (LCs) are anisotropic viscoelastic materials with fluid-like and crystal-like properties. The anisotropy of the viscosity coefficients, with respect to different flow directions, is a unique property of the liquid crystalline phase. Using the presented method, the required viscosity coefficients for different concentrations of Graphene Oxide (GO) dispersion, as a DNLC, were obtained. GO, the most processable derivative of graphene, is oxygen-functionalized graphene and has attracted enormous attention due to the unique liquid crystal and rheological properties. Shear-thinning rheological behavior of the nematic GO dispersion has opened an easy way to fabricate graphene-based devices in micro and macro scales. Our results showed that the alignment viscosity from the analytical method was consistent with the experimental one. Using the calculated viscosity coefficients, the numerical simulation results of the nematic GO under flow were consistent with the experimental results.

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