

Statistical mechanics studies for nematic liquid crystals

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In statistical mechanics, the partition function Z is an important quantity that encodes the statistical properties of a system in thermodynamic equilibrium. The canonical partition function applies to a canonical ensemble, in which the system is allowed to exchange heat with the environment at fixed temperature, volume, and number of particles. Nonlinear optics can be expected to play an important role in the emerging technology of photonics. In recent years, liquid crystals have attracted considerable attention. Therefore their physical parameters such as internal pressure and order parameters are very important in the studies. [1,2]

In this investigation, we calculate the partition function of nematic liquid crystal using a theoretical method. [3] For this purpose, we assumed the liquid crystal molecules as electrical dipoles and measured their interaction with near neighbours. The partition function and other statistical parameters of nematic liquid crystals are obtained by this method. Finally, these parameters have been studied and compared with some real cases and the energy, internal pressure and order parameter have been measured as a function of temperature.

References:

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