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Kinematics of Liquid Crystal used in LCD Screens of Sport's Watches DIPTI SHARMA, GERMANO IANNACCHIONE, WPI — Properties of phase transitions of liquid crystals are used to manufacture LCD screens of watches and TVs. The kinematics of phase transitions of bulk liquid crystals pay vital role to understand the thermodynamic behavior of liquid crystals which further can be used in LCD screens of watches. Here we present the kinematics of phase transitions of bulk liquid crystal octylcyanobiphenyl (8CB) using calorimetry technique. Bulk 8CB was studied at different heating scan rates from 20 to 0.5 K/min for heating and cooling scans. Transition peaks, observed at the melting/crystallization, smectic-A to nematic (SmA-N), and nematic to isotropic (N-I) transitions, showed significant temperature shift in respective peaks with different scan rates following an Arrhenius behavior. The activation energy of a transition increases as the total energy involved in the transition decreases. The more enthalpy or latent heat involved in the transition belongs to less activation energy of the transition. This shows the significance of the 1^{st} order transition as a transition from N to I, and needs less activation than 2^{nd} order transition from SmA to N transition and hence liquid crystal is more used in this transition range for LCD screens of watches.

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