

## **Rheology of Liquid Crystalline Polymers (LCPs)**

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Rheology of Liquid Crystalline Polymers (LCPs) Rahul K Gupta\*, Sati N. Bhattacharya  
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**ABSTRACT** A liquid crystal polymer has a particular kind of structural orientation at one or two dimensional level. This structural orientation makes the rheological properties of Liquid Crystal Polymers (LCPs) often extraordinary and partially understood. Furthermore, these properties vary from one LCP to another, which results in an unpredictable behaviour. It has been reported that accurate measurements of the shear rheological properties of (LCPs) is critical to allow accurate prediction, as it flows under pressure in a typical injection moulding machine. Thus, rheological properties of five thermotropic LCPs were investigated to accurately measure these properties. The dynamic viscosities of the five LCPs show a typical shear-thinning behaviour. As to the temperature effect, the dynamic viscosities give rise to different responses. A not so typical response of dynamic viscosity was found with grades 4179 and 4246. There was a decrease of viscosity as the LCPs were heated above the melting temperatures. Following this the viscosities levelled off and then increased gradually with further increasing of temperature. The abnormal temperature dependence of the dynamic viscosities can be explained by the nematic-isotropic transition, in which the rod-like molecules lost part of their orientation ordering and became partially isotropic. **Keywords:** Liquid Crystal Polymer, Shear Rheology, Shear Thinning