

Transient Current Investigations in Liquid Crystalline Polyurethane

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Abstract : Electrical conduction behavior of liquid crystalline polyurethane (LCPU) has been investigated under transient conditions in the operating temperature range 50-220°C at various electric fields of 4.35-43.45 kV/cm. The transient currents show the hyperbolic decay character and the decay exponent Δt (one tenth decay time) dependent on field as well as on temperature. The increase in I_0/I_s values (where I_0 represents the current observed immediately after applying the voltage and I_s represents the steady state current) and the variation of mobility at high operating temperatures shows the appearance of mesophase. The origin of transient currents has been attributed to the dipolar nature of carbonyl (C=O) groups in the main chain of LCPU and the trapping charge carriers.

Keywords : electrical conduction, transient current, liquid crystalline polymers, mesophase

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