

High Pressure Dielectric Studies of a Substance with the Smectic A₁ Phase

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The results of dielectric studies of 5-*n*-hexyl-2-(4'-isothiocyanato)-1,3-dioxane (6DBT) in the smectic A₁ phase at pressures up to 150 MPa and temperatures up to 340 K are presented. The low frequency relaxation time $\tau_{\parallel}(p, T)$ yields the activation volume $\Delta^{\#}V_{\parallel} = RT(\partial \ln \tau_{\parallel} / \partial p)_T$ and activation enthalpy $\Delta^{\#}H_{\parallel} = R(\partial \ln \tau_{\parallel} / \partial T^{-1})_p$. The calculated values of these parameters are compared with those obtained recently for *n*-octyl-cyanobiphenyl (8CB) forming the smectic A_d phase. In the case of 6DBT both these quantities are practically constant, whereas those for 8CB decrease, when going away from the phase transitions isotropic – smectic A₁ (6DBT) or nematic – smectic A_d (8CB). These differences support our earlier conclusion that increase of pressure leads to a breaking of the antiparallel associations of cyanobiphenyl molecules in the smectic as well as in the nematic phases.

Key words: Liquid Crystal; Smectic A, Dielectric Properties, High Pressure.