

TRANSIENT AND STEADY ELECTRIC CURRENTS
IN A CELL WITH NEMATIC LIQUID CRYSTAL
PENTYL-CYANOBIPHENYLE

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S u m m a r y

We have studied transient and steady electric currents in cells made of two glasses covered with indium tin oxide (ITO) and liquid crystal (LC) pentyl-cyano-biphenyl (5CB) in between. We demonstrated that space-charge effects are important here, contrary to what has been adopted before. Specifically, the nematic interlayer can be considered as an inhomogeneous medium with near-electrode double layers produced by some kind of a selective adsorption of ions supplied by the LC. The bulk of the LC contains charge carriers of both signs, which might be either extrinsic (impurity) or intrinsic ones. In the latter case, they can be imagined as heavy fragments of LC molecules. In the steady-current regime, the current-voltage characteristics are determined by the space charge injected or emitted into the nematic from the electrodes. For large enough biases U , the steady current saturates, since the space charge cloud is depleted. Transient phenomena observed by us testify that we are dealing with at least two kinds of charge carriers.