

'ANOMALOUS'
HIGH-FREQUENCY CONDUCTIVITY OF
LIQUID CRYSTALS IN THE SMECTIC PHASES

*A. V. Koval'chuk, M. N. Pivnenko*¹

Institute of Physics, Nat. Acad. Sci. of Ukraine
(46, Nauky Prosp., Kyiv 03028, Ukraine),

¹Southampton Liquid Crystal Institute,
Department of Physics and Astronomy
(University of Southampton, Highfield,
Southampton, SO17 1BJ, UK)

S u m m a r y

We have found an 'anomalous' increase of conductivity (more than one order of magnitude) under the cholesteric-to-smectic *A* phase transition by studying the temperature dependence of the alternating current conductivity for a ferroelectric liquid crystal (FLC) that is the mixture of an ester eutectic and chiral dopant Luch-15. As the similar increase was not observed for the direct current conductivity, we assume that the 'anomalous' conductivity increase is caused by the nonlinear polarization process. A model is proposed to show that the contribution of the bias current into the conductivity current can be described by taking into account a linear time dependence of capacity. For a triangular measuring signal, such a character of the capacity dependence corresponds to the quadratic electric field dependence of polarization. The dependence of the 'anomalous' conductivity increase on the molecule orientation is analyzed as well as the influence of the FLC conductivity on electro-optic effects.