

OPTICAL BEHAVIOUR OF CHOLESTERIC BLUE PHASES IN  
ELECTRIC FIELDS

B.M. Leon Fonq\*, G. Heppke\*\* and J.A. Martín-Pereda\*\*\*

\* E.T.S. Ing. Industriales. Vigo. Spain

\*\* TU Berlin -C2- Str. des 17. Juni 135, D-1000 Berlin.DBR.

\*\*\* E.T.S. Ing. Telecomunicacion. Ciudad Universitaria.  
Madrid-3. Spain.

The optical behaviour of cholesteric mixtures of negative dielectric anisotropy under electric fields is reported. A mixture of S 311<sup>-</sup> (31.35 %) + N 5 was employed. AC voltages ( $f = 1000$  Hz) between 0 and 150 volts were applied. Cells 23 microns thick, with internal SnO<sub>2</sub> electrodes, were used.

The obtained results are:

- i) Electric fields applied to blue phase II (BP II) move the reflectivity maximum towards larger wavelengths. 11 nm. were obtained for a field  $E \approx 6.09 \cdot 10^4$  V/cm. Intensity grows with the field.
- ii) Electric fields applied to blue phases near the transition BP II  $\rightarrow$  BP I, where an intensity maximum around 500 nm is located, originate a new peak at 560 nm. The first one is a BP I peak and BP II the second one. An electric field phase transition is obtained.
- iii) If an electric field is applied to the BP I, with 50.8 volts ( $E = 2.21 \cdot 10^4$  V/cm) a transition from BP I to BP II is achieved.
- iv) If the cholesteric mixture is in a bath with smaller temperature than in the previous cases, a change from BP I to cholesteric phase is obtained.

Similar results have been obtained by other authors for cholesterics with  $\Delta\epsilon < 0$ .