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Electro-optical Characteristics of Carbon Nanotupe Doped Polar Smectic Liquid Crystal[1] ILKNUR KOSEOGLU, Department of Physics, Istanbul Technical University, 34469, Maslak, Istanbul, Turkey, MEHMET CAN CETINKAYA, Piri Reis University, 34970, Tuzla, Istanbul, Turkey, HALUK OZBEK, SEVTAP YILDIZ, Department of Physics, Istanbul Technical University, 34469, Maslak, Istanbul, Turkey, ITU LIQUID CRYSTAL LAB TEAM
— We present the results of electro-optical characteristics of the liquid crystal octyl-cyanobiphenyl (8CB) doped with well-dispersed multiwall carbon nanotubes (MWCNT) under an AC driving voltage. 8CB-MWCNT composites were prepared by following the procedures in literature [1-4]. Polarized optical microscopy (POM) has been performed to check the homogenous dispersion of 8CB-MWCNT composite. We compare threshold voltages and switching behavior of pure 8CB and 8CB doped with MWCNTs which have surfaces of untreated and treated with carboxyl functional group. Threshold voltages have been determined from optical transmittance-driving voltage curves at various temperatures. While the pure 8CB switches from a bright state through some intensity oscillations to the dark state, a drastic change has been observed in the transmittance curves for 8CB-MWCNT composites, namely hysteretic behavior has been detected. For 8CB-MWCNT composites we have observed that the first cycle for the transmittance-voltage curves shows the highest amount of loop area, which gradually decreases through the following cycles, then reaching saturation. Notice that the number cycle at which the saturation is reached depend on temperature [5].

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