Electro-optical Characteristics of Carbon Nanotube Doped Smectogen Octylcyanobiphenyl

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In this work we present the results of electro-optical characteristics of the polar liquid crystal octylcyanobiphenyl (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 \cite{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. Also, we determine the response time, namely the rise and fall times, of 8CB-MWCNT composites and then compare the results with pure 8CB.