Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Three dielectric constants and orientation order parameters in nematic mesophases[1] HYUNG GUEN YOON, SEUNG YEON JEONG, SATYENDRA KUMAR, Kent State University, MIN SANG PARK, JUNG OK PARK, M. SRINIVASARAO, Georgia Instittue of Technology, SUNG TAE SHIN, LCD R&D Center, Samsung Electronics Corp. — Temperature dependence of the three components ε_1, ε_2, and ε_3 of dielectric constant and orientation order parameters in the nematic phase of mesogens with rod, banana, and zero-order dendritic shape were measured using the in-plane and vertical switching geometries, and micro-Raman technique. Results on the well-known uniaxial (N_u) nematogens, E7 and 5CB, revealed two components $\varepsilon_1 = \varepsilon_{||}$ and $\varepsilon_2 = \varepsilon_3 = \varepsilon_\perp$, as expected. The three dielectric constants were different for two azo substituted (A131 and A103) and an oxadiazole based (ODBP-Ph-C12) bent core mesogens, and a Ge core tetrapode. In some cases, two of the components became the same indicating a loss of biaxiality at temperatures coinciding with the previously reported N_u to biaxial nematic transition. This interpretation is substantiated by micro-Raman measurements of the uniaxial and biaxial nematic order parameters.

[1]Supported by the US Department of Energy, Basic Energy Sciences grant ER46572 and by Samsung Electronics Corporation.

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Date submitted: 27 Nov 2010 Electronic form version 1.4