Rf/ac-calorimetry on 8CB+ aerosil dispersions

SAIMIR BARJAMI, WPI, GERMANO IANNACCHIONE, WPI — Using a new high-resolution AC calorimetric technique employing RF (dielectric) heating, both the heat capacity and permittivity of a sample may be simultaneously probed. Relative resolutions of better than 0.06% in the ratio of heat capacity to applied heating power, and 0.03% in the phase shift measurements are easily obtained. This new and powerful technique has been applied to aerosil dispersions in the liquid crystal octylcyanobiphenyl (8CB) through the I-N and N-SmA phase transitions. The temperature dependence of the applied heating power, proportional to the permittivity and hence the orientational order, shows no change through the N-SmA for \( \rho_S = 0.1 \) g/cc. This indicates that at the point where sharp \( C_p \) features are lost, the SmA and N phases are effectively decoupled, consistent with recent NMR studies.