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Dielectric characteristics of highly ionic Antiferroelectric Liquid Crystalline Material

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Abstract

We report dielectric spectroscopy of a room temperature single phase antiferroelectric liquid crystalline material namely (S) + (1-methylheptyloxycarbonyl)2-fluorophenyl 4'-(3-perfluoropropylmethylnoxy prop-1-oxy)biphenyl-4-carboxylate in the frequency range 1 Hz to 35 MHz under planar anchoring conditions of the molecules. Dielectric, thermodynamic and texture studies confirm a wide room temperature range single antiferroelectric (SmC_a^*) phase between crystal and isotropic phase of this material. Three relaxation modes (due to collective as well as individual molecular process) appeared in the SmC_a^* phase. The contribution of ionic conductivity in SmC_a^* phase has also been determined.

Keywords: Antiferrodielectric liquid crystal, Antiferrodielectric Goldstone mode, ionic conductivity, dielectric permittivity, dielectric relaxation.

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