Effect of the Magnetic Field on the Structure of Chiral Phases by NMR

C.A. Veracini, V. Domenici

[1]Department of Chimica e Chimica Industriale
Pisa University
Via Risorgimento 35 56126 Pisa Italy
e-mail: verax@dcci.unipi.it

The effects of Magnetic Fields on Liquid Cristaline materials, although less ubiquitous than those of Electric Fields, have been extensively explored since the paper of R. Mayer on Cholesteric LC in 1968 (1).
The director orientation by Magnetic Fields in Nematic Cells has been investigated by Reznikov *et al.* (2);Deuterium Nuclear Magnetic resonance (DNMR) has been used by Blinc *et al.* to study soliton-like distortions, revealed by spectral line-shape, as a function of Magnetic Field direction in aligned, deuteriated FLCs (3); unwinding of the helical structure of FLCs, with a field induced SmC* - SmC^*_{unw} phase transition with the magnetic field along the helical axis, has been successively studied both experimentally and theoretically by Veracini *et al.* (4). Later on this phenomenon has been deeply investigated by using DNMR at different magnetic fields on several FLCs and also on the rare re-entrant SmC* phase (5).
Similar approaches have been exploited also in the study of frustrated phases, such as TGBA and TGBC*, revealing interesting features about their supramolecular structure (block dimensions, tilt and helical periodicity), their stability at high magnetic fields and magnetic field induced deformations of the helical structure (6).
Recently, DNMR studies were employed to study de Vries LC systems, possibly clarifying the structure of the SmA* phase. (7)

References

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