THE STRUCTURAL PHASE TRANSITIONS IN 6CB-BASED FERRONEMATICS

N. Tomašovičová, M. Koneračka, P. Kopčanský, M. Timko, V. Závišová, L. Tomčo and J. Jadzyn

aInstitute of Experimental Physics, Slovak Academy of Sciences, Watsonová 47, 04001 Košice, Slovakia
bFaculty of Aeronautics, Technical University, Rampová 7, 041 21 Košice, Slovakia
cInstitute of Molecular Physics, Polish Academy of Sciences, Smoluchowskiego 17, 60179 Poznan, Poland

Ferronematics are magnetic colloids based on a liquid crystal matrix and were first suggested on theoretical grounds in 1970 by Brochard and de Gennes. The surface anchoring in the magnetic particles couples the magnetic and nematic order and dramatically increases the weak magnetic interaction. The structural transitions in ferronematics based on the thermotropic nematic liquid crystal 6CB (p-hexyl-p'-cyanobiphenyl) were studied. The ferronematic samples were prepared by doping with magnetic suspension consisting of Fe₃O₄ particles (10 nm in diameter) coated with oleic acid as a surfactant, with volume concentration of magnetic particles $\phi_1 = 10^{-4}$, $\phi_2 = 2 \times 10^{-4}$ and $\phi_3 = 10^{-3}$. Freedericksz transitions were studied in combined electric and magnetic fields. The obtained results show the decrease of the critical magnetic field with increasing volume concentration of magnetic particles.

Subject category:
5. Nano-structure, Surfaces, and Interfaces

Presentation mode:
poster

Corresponding author:
N. Tomašovičová

Address for correspondence:
Institute of Experimental Physics
Slovak Academy of Sciences
Watsonová 47
04001 Košice
Slovakia

Email address:
hudak@saske.sk