



Contribution ID: 104

Type: not specified

Intra- and intermolecular dynamics in liquid-crystalline substance with ferro- and antiferroelectric phases

Tuesday, July 7, 2015 6:30 PM (1 hour)

For 1-[3-fluoro-4-(1-methylheptyloxy carbonyl)phenyl]-2-[4'-2,2,3,3,4,4,4-heptafluoro butoxybutoxy)biphenyl-4-yl]ethane (1F7) built of chiral molecules, intra- and intermolecular dynamics is presented. Intermolecular dynamics was studied by dielectric spectroscopy while intramolecular dynamics by nuclear magnetic resonance and infrared spectroscopy. In ferroelectric SmC, *antiferroelectric SmC_A* and highly ordered SmI*_A phases of 1F7 the relaxation processes were detected in frequency range from 0.05 Hz to 3 MHz. Mechanisms of intermolecular dynamics were identified with the help of the bias field [1]. Using NMR technics the following intramolecular motions were detected: rotation of the CH₃ and CF₃ groups and reorientation of the phenyl rings. In liquid-crystalline phases molecular processes connected with rotation molecule around short and long axis were confirmed. Relaxation time τ_1 , correlation time τ_c and activation barriers were calculated for individual motions. Infrared spectroscopy method shows rich dynamics in Cr1 and Cr2 crystalline phases [2].

References

- [1] Kolek, Ł.; Massalska-Arodź, M.; Paluch, M.; Adrjanowicz, K.; Rozwadowski, T.; Majda, D.; *Liq. Cryst.* 2013, **40**, 1082.
- [2] Kolek, Ł.; Massalska-Arodź, M.; Hołderna-Natkaniec, K.; Woźniak-Braszak, A.; Juszyńska-Gałązka, E.; *Intramolecular dynamics of a liquid crystal with fluorinated molecules (1F7)* (in preparation).

Primary author: Dr KOLEK, Łukasz (Department of Materials Sciences, Rzeszów University of Technology, Poland)

Co-authors: Dr WOŹNIAK-BRASZAK, Aneta (Institute of Physics, Adam Mickiewicz University, Poznań); Dr JUSZYŃSKA-GAŁĄZKA, Ewa (Institute of Nuclear Physics PAN, Kraków); Prof. HOŁDERNA-NATKANIEC, Krystyna (Institute of Physics, Adam Mickiewicz University, Poznań); Prof. MASSALSKA-ARODŹ, Maria (Institute of Nuclear Physics PAN, Kraków); Dr ROZWADOWSKI, Tomasz (Institute of Nuclear Physics PAN, Kraków)

Presenter: Dr KOLEK, Łukasz (Department of Materials Sciences, Rzeszów University of Technology, Poland)

Session Classification: Posters