

# NONIONIC SURFACTANTS AS A TOOL FOR CREATION LYOTROPIC LANTHANIDE CONTAINING SYSTEMS

N. Selivanova<sup>a</sup>, W. Haase<sup>b</sup>, V. Lobkov<sup>c</sup>, V. Osipova<sup>a</sup>, M. Strelkov<sup>a</sup>, Y. Galyametdinov<sup>a,c</sup>.

<sup>a</sup>*Kazan State Technological University. Kazan. K Marks, 68. natsel@mail.ru*

<sup>b</sup>*Institute of Physical Chemistry, Darmstadt University of Technology, Peteresenstr. 20, D-64287 Darmstadt, Germany*

<sup>c</sup>*Kazan Physical and Technical Institute named after Ye. K. Zavoisky of the Russian Academy of Sciences, ul. Sibirskiy Trakt 10/7, 420029, Kazan, Russia*

Nanostructured systems based on lyotropic liquid crystal (LLC) assemblies appear to be promising materials for different technological and chemical applications. Introduction of metal ions in such mesomorphic system allow to create new functional properties [1,2]. The majority of known lyotropic liquid-crystalline systems is formed from alkyl derivatives and transition metal ions with the coordination number (CN) 4. In this contribution we report on the synthesis of lanthanide ion containing lyotropic mesophases where the CN of the central metal ion is 9. Composition with well known non-ionic surfactants  $C_{12}H_{25}(CH_2CH_2O)_{10}OH$  and  $C_{12}H_{25}(CH_2CH_2O)_4OH$  (Brij) as well as (oxyethylene)<sub>12</sub>nonylphenol ether -  $C_9H_{19}C_6H_4O(CH_2CH_2O)_{12}H$  has been investigated. The assemblies between non ionic surfactants and lanthanide nitrate (Ln = Eu, La) aqua complexes on one side and ternary surfactant – Ln salt – water systems on the other side has been established. The phase behavior and the range of mesophase existence were estimated by polarizing optical microscopy and differential scanning calorimetry. All synthesized compositions show lyotropic mesomorphism. The new complexes were characterized by IR and NMR spectroscopy. The structure of the mesophase was studied by SAXS. It could be shown that the lyotropic mesophase exist in a wide temperature range, including room temperature, and exhibit the fan texture of the hexagonal phase. The influence of the kind of metal ion, of the surfactant and of the concentration of water or D<sub>2</sub>O on the range of the mesophase has been investigated. It is found that the intensity of the luminescence of the Eu<sup>3+</sup>- containing system increase in oriented samples.

This work was supported by RFBR \_ 04-03-32923

## Reference:

[1] Donnio B. *Current Opinion in Colloid & Interface Science* **2002**, 7, 371-394.

[2] Gin D. L., Gu W., Pindzola B. A., Zhou W.-J. *Acc. Chem. Res.* **2001**, 34, 973-981.