# NEW SUPRAMOLECULAR MESOMORPHIC MATERIALS FOR TRIBOSYSTEMS

Syrbu S.A.[a], Novikov V.V.[a], Fedorov M.S.[a], Kiselev M.R.[b]

[a]Ivanovo state university, Ermak str., 39, Ivanovo, 153025, Russia
e-mail: syrbue@yandex.ru
[b]Frumkin Institute of Physical chemistry and Electrochemistry Russian academy of sciences,
Leninsky prospect, 31, bld.4, Moscow, 119071 Russia

New supramolecular complexes based on mesogenic 4-n-alkyloxycinnamic acids (n-AOKK, n = 2,3,7,8) and 1,2-bis(4-pyridyl) ethane nemesogen (BPE) were obtained from the melt of their mixtures with a molar ratio of 2:1, respectively. The formation of complexes was confirmed by IR spectroscopy. Using the methods of differential scanning calorimetry and polarization thermomicroscopy, it was demonstrated that the obtained complexes have mesomorphic properties. The temperature range of the nematic mesophase existence increases for all H-complexes under study and their temperature of phase transition to isotropic liquid decreases, as compared with individual acids. The structural formula of the H-complexes supermolecules is given below.
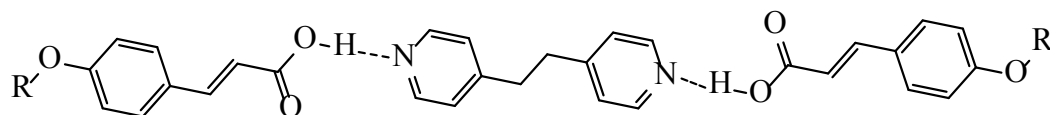
We used the obtained compounds as additives to lubricants at boundary friction. High tribological efficiency was showed. We conducted a study on the friction and wear of lubricant compositions of these substances in the conditions of lean lubrication with reciprocating motion of the slider at a specific pressure at the contact of 80 MPa and a sliding speed of 2 mm / s, which showed that the wear resistance of the oil film of the lubricant with additives of these compounds increased tenfold compared to the base solvent oil and the prototype compositions. Currently, the developed lubricants undergo the procedure of patenting. In addition, prospects for the practical use of the compounds under study as triboactive additives to lubricating oils for friction units operating under high pressure and boundary lubrication (sliding bearings, etc.) are determined.