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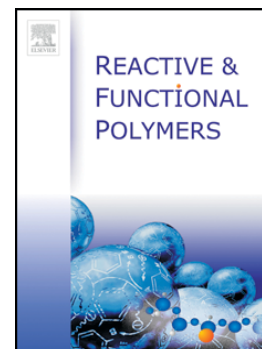
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Structure of hydrogen bonded supramolecular self-assemblies controlled by the structure of monomers: 1,1- and 1,3-diethylureas

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Asymmetrically disubstituted 1,1-diethylurea, the moiety $\text{HNH}\cdot\text{CO}$ of which is capable of forming intermolecular hydrogen bonds with the possibility of creating two extremely different supramolecular entities: *i*) highly polar polymeric chains, analogous to those created by secondary amides, and *ii*) non-polar cyclic dimers, analogous to those created by lactams, in the experiment reveals exclusively the cyclic dimers. A solution of 1,1-diethylurea in non-polar solvent (with the mole fraction of urea 0.04) exhibits very low permittivity (about 3) what is in marked contrast to the permittivity (about 11) of analogous solution of symmetrically disubstituted 1,3-diethylurea, known for its strong chain polymerization. The difference of two orders of magnitude in the electrical conductivities of 1,1- and 1,3-diethylurea (ionically undoped) solutions suggests a probable participation in the conductivity of the protons released in process of thermal rupture of the hydrogen bonds linking 1,3-diethylurea molecules in supramolecular polymeric chains.

Keywords:

Supramolecular polymers, 1,1-diethylurea, 1,3-diethylurea, Impedance spectroscopy, Hydrogen bonding

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