

Stereochemistry

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The influence of [R(HO)SiO] stereoisomers structure on the conformation of the polyorganosilsesquioxanes unit in the polycondensation reaction

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The aim of this work is to study the influence of the structure and reaction ability of the (tetrahydroxy) (tetraorgano) cyclotetrasiloxanes stereoisomers on the structure and composition of the forming products in different polycondensation conditions in the presence or absence of layered architecture compounds (LAC) under equilibrium and nonequilibrium reaction conditions. The structure and the composition of polycondensation products were confirmed by ^{29}Si NMR, IR spectroscopy, APCI MC analysis, GPC and powder x-ray diffraction. The study revealed that the polycondensation of stereoisomers in nonequilibrium conditions in absence of LAC results in the production of the cage-like compounds. The equilibrium conditions of polycondensation lead to the appearance of a homologous series with defective cage-like structure. The polycondensation of stereoisomers $[\text{R}(\text{HO})\text{SiO}]_4$, where $\text{R}=\text{C}_6\text{H}_5$, $m\text{-CH}_3\text{C}_6\text{H}_4$, $m\text{-ClC}_6\text{H}_4$ in the presence of LAC gives polymers with various structures: iso-syndiotactic cyclolinear, columnar type and branched. The type of unit structure depends on the structure of the initial stereoisomer. With the example of all cis and cis-trans-cis- $[\text{C}_6\text{H}_5(\text{HO})\text{SiO}]_4$ isomers. It was shown that starting cyclotetrasiloxanes conformation was inherited in the polycondensation reaction in the presence of montmorillonite with cyclolinear polyphenylsilsesquioxane obtained. The ^{29}Si NMR and IR revealed the differences in the structure of cyclolinear polyorganosilsesquioxanes units, depending on whether they were synthesized by polycondensation of stereoisomers or by anion polymerization.

Biography

Makarova N N has completed her PhD and Post-doctoral studies from the Nesmeyanov Institute of Organoelement Compounds, Russian Academy of Sciences. During 1989-2015, she served as a Leader of Mesomorphic Organosilicon Compounds Group.

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