Supramolecular formations of fullerene C_{60}-containing poly(ethylene oxide) in deuterobenzene

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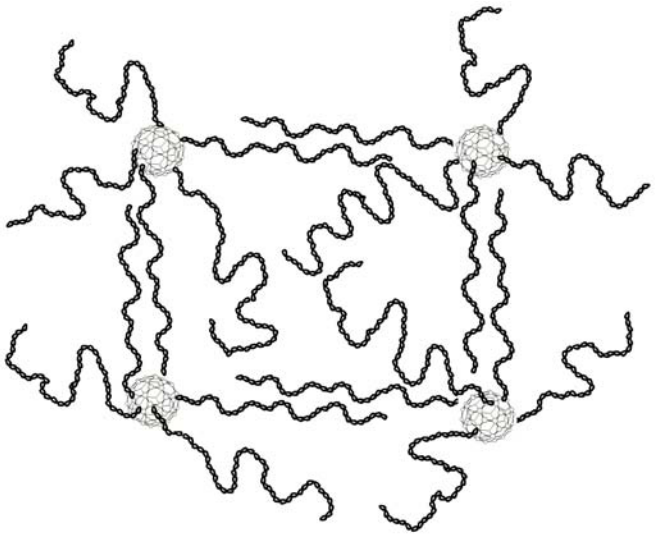
A new method for the synthesis of star-shaped fullerene C_{60}-containing poly(ethylene oxide) is developed and its hydrodynamic properties are studied. Then the molecular structure of stars in deuterobenzene was analyzed by the small-angle neutron scattering using Fourier data analysis to recognize the mechanisms and forms of structuring (self-assembly) of poly(ethylene oxide) chains being structural elements (star arms) of macromolecules of complex architecture. The peculiar forms of spontaneous self-organization of star-shaped macromolecules were revealed. It was found that the resulting equilibrium structure has specific topology. Some of polymer chains acquire stretched conformations in the solution and act as physical links between other chains, which leads to the formation of polymer framework filled with coiled chains. Fullerene-containing poly(ethylene oxide)s have 6 arms. Star architecture leads to enhanced ability of these polymers to form highly ordered structures in solution.



The work was supported by Russian Foundation for Basic Research (grant 10-03-00191a) and Program for Basic Research of the Presidium of RAS № 21.