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P-tert-butyl thiacalix[4]arenes functionalized with amide and hydrazide groups at the lower rim in cone, partial cone, and 1,3-alternate conformations are "smart" building blocks for constructing nanosized structures with metal cations of s-, p-, and d-elements in the organic phase

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Abstract

The ability of p-tert-butyl thiacalix[4]arenes functionalized with tertiary and secondary amide and hydrazide groups at the lower rim in cone, partial cone, and 1,3-alternate conformations to self-assemble and recognize metal ions of s- (Li⁺, Na⁺, K⁺, Cs⁺), p- (Al³⁺, Pb²⁺) and d- (Fe³⁺, Co³⁺, Ni²⁺, Cu²⁺, Ag⁺, Cd²⁺, Hg²⁺) elements was investigated by picrate extraction method and dynamic light scattering (DLS). DLS was used for determination of the hydrodynamic diameter, polydispersity index, and molecular weight of nanoscale aggregate systems consisting of p-tert-butyl thiacalix[4]arene molecules and metal nitrates. Also for quantitative determination of the dimer shape from the values of molecular weight and the particles size, the Perrin factor (F) was established. It was shown that in most cases the dimers of stereoisomers of p-tert-butyl thiacalix[4]arenes tetra- substituted at the lower rim by secondary amide groups represent the prolate spheroid. © 2009 American Chemical Society.

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