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Design and applications of supramolecular systems based on (thia)calixarene ammonium derivatives

Stoikov I., Padnya P., Andreyko E., Puplampu J.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

 Currently in supramolecular chemistry, much attention is devoted to scientific fields like molecular recognition, catalysis, self-assembly and nano-medicine which are essential in the development of science and industry. The design of synthetic receptors capable of recognizing different types of guests is a prerequisite in the construction of sensors, catalysts, biomimetic systems, selective extractants, drug delivery systems and programmable materials. The unique properties of (thia)calix[n]arenes (they exist in several configurations, the possibility of functionalizing them with different binding sites and the ability to fix these centers in the required spatial orientation) offer great opportunities in the design of synthetic receptors. The major setback of (thia)calixarene receptors is their poor solubility in water. However, introducing charged groups such as ammonium, phosphate, carboxylate and sulfonate enhances the water solubility of the macrocycles. The ammonium group is one of the most convenient synthetic fragments. This chapter describes a series of examples of introducing ammonium fragments into the (thia)calixarene platform, resulting in the production of ionic compounds: catalysts, receptors for cations, anions and various biological objects, such as DNA and proteins.

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