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Formation of unsymmetrical trinuclear metallamacrocycles based on two different cone calix[4]arene macrocyclic rings

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Abstract

 A combination of tetrasulfonylcalix[4]arene (3-4H) together with a calix[4]arene dicarboxylate derivative 2-4H led, in the presence of MII(NO3)2 (M = Co, Ni, Zn), to the formation of three novel isostructural metallomacrocycles of formula [M3(DMF)2(μ3-H2O)-(2-2H)-3]. The structure of the prepared coordination compounds was studied in the solid state using single crystal/powder X-ray diffraction studies. The X-ray diffraction on single crystal revealed that the structure of the obtained supramolecular complexes is composed of a trinuclear metallic cluster [M3]+6 held between one di-deprotonated molecule of (2-2H)2− offering two carboxylate groups for binding metal cations and one tetra-deprotonated compound 34−, where four oxygen atoms, belonging to four deprotonated phenolic moieties and three oxygen atoms coming from three SO2 groups, are coordinated with the cluster core. Thus, an example of an easily reproducible molecular recognition pattern involving two different types of calix[4]arene based ligands, displaying different coordination moieties, and trinuclear metallic clusters, is reported here. In addition, it has been shown that the cone moieties of the calixarene also encapsulate solvent molecules.

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Keywords

Carboxylic derivatives of calix[4]arene, Coordination compounds, Metallomacrocycle, Tetrasulfonylcalix[4]arene, Trinuclear clusters

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