

Outer-sphere association of p-sulfonatothiacalix[4]arene and tetrasulfonatomethylated calix[4]resorcinarene with cobalt(III) tris(dipyridyl): the effect on the spectral and electrochemical properties of the latter

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Abstract

According to the ^1H NMR and X-ray data, the outer-sphere association of $[\text{Co}(\text{dipy})_3]^{3+}$ with cyclophanic anions p-sulfonatothiacalix[4]arene and tetrasulfonatomethylated calix[4]resorcinarene is accompanied by the inclusion of the dipyridyl moiety of the former into the cavities of the cyclophanic anions in aqueous and aqueous-DMSO solutions and in the solid state. The first-step dissociation of p-sulfonatothiacalix[4]arene does not change the inclusion mode, but the increase in DMSO content leads to a shallower inclusion of $[\text{Co}(\text{dipy})_3]^{3+}$. The electrochemical property changes of $[\text{Co}(\text{dipy})_3]^{3+}$ with both receptors undergoing ion pairing indicate the stabilization of the tris-(dipyridyl) cobalt complexes in lower oxidation states. The effect of the cyclophanic anions on the cyclic voltammograms of $[\text{Co}(\text{dipy})_3]^{3+}$ correlates with the efficiency of binding of the latter with tetrasulfonatomethylated calix[4]resorcinarene and p-sulfonatothiacalix[4]arene. © 2005 American Chemical Society asiya@iopc.knc.ru A. E. Arbuzov Institute of Organic & Physical Chemistry Kazan State University.

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