

Complexation and self-assembling of sulfonatomethylated calix[4]resorcinarene with both organic and lanthanide ions in aqueous media

Amirov R., Mustafina A., Nugaeva Z., Fedorenko S., Kazakova E., Konovalov A., Habicher W.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

The stoichiometry and binding constant of the paramagnetic lanthanide ion (Gd^{3+}) with sulfonatomethylated calix[4]resorcinarene (H_8Xna_4) were evaluated from the NMR relaxation data. Both 1H NMR spectroscopy and NMR relaxation data indicate that interaction of tetramethylammonium (TEMA) and N-methylpyridinium (MePy) cations with H_8Xna_4 in the presence of Ln^{3+} (Lu^{3+} or Gd^{3+}) results in the formation of ternary complexes $[Ln(G)H_8X]$ with lanthanide ions, coordinated via sulfonate groups and organic cation included into the cavity of H_8Xna_4 . The inclusion of long-chained N-decyl-(DePy) and N-cetylpyridinium (CPy) ions into H_8Xna_4 cavity leads to self-assembling which can be revealed by NMR relaxation method with Gd^{3+} probe ions. The excess of alkylpyridinium or TEMA cations leads to disassembling of $(Gd)_n(H_8X)_m(RPy)_m$ aggregates. © 2004 Kluwer Academic Publishers.

<http://dx.doi.org/10.1023/B:JIPH.0000048309.35139.c7>

Keywords

Inclusion, Lanthanide ion, Self-assembly, Water soluble calix[4]resorcinarene