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Structure-property relationship for clathrates formed in systems with guest vapor and 1,3-disubstituted tert-butylcalix[4]arene

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Abstract

Structure-property relationship was studied for a series of clathrates formed in the systems that model guest-host interactions on the surface of chemical odor sensors of quartz microbalance type. The clathrates of 5,11,17,23-tetra-tert-butyl-25,27-dihydroxy-26,2-bis(2-naphthylmethoxy)calix[4] arene (1) obtained by the saturation of its powder with gaseous organic compounds (guests) with the unity thermodynamic activity at 298 K were studied. The stoichiometry and temperature at the starting and ending points of thermal dissociation were determined for all the clathrates and stable intermediates by thermal gravimetric analysis. A sorption isotherm was determined for one guest-host combination; it indicates the formation of a stable clathrate in the system and phase transition of host upon reacting with guest. Decrease in thermal stability of the clathrates of 1 with guests of greater size was observed for studied pairs of homologous guests. © 2005 Springer Science+Business Media, Inc.

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Keywords

Calixarenes, Clathrates, Gas phase chromatographic analysis, Inclusion compounds, Sorption isotherm, Thermogravimetry