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Molecular recognition of organic compounds by the data on polymorphic and pseudo-polymorphic transformations of tert-butylthiacalix[4]arene derivative

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Abstract

The receptor properties of metastable polymorphic forms of 5,11,17,23-tetra(tert-buty-)-25,26,27,28-tetrakis[N-(2-ethoxycarbonyl(methyl) carbamoylmethoxy]-2,8,14,2--tetrathiacalix[4]arene in the cone and partial cone configurations obtained by the crystallization of their solutions in an organic solvent were studied. The ability of the studied calixarenes to "remember" the history of interaction with individual vaporous organic guests and their mixtures was discovered. The observed different effects of methanol and ethanol vapors on the phase state of the studied calixarene in the cone configuration can be used for qualitative and quantitative analyses of ethanol in binary mixtures. Calixarene in the partial cone configuration can remember the earlier bound methanol. The "memory" effect appears as a specific polymorphic transition in the receptor phase after bound methanol leaving on heating the clathrate. This effect is not observed for other studied guests. © 2014 Springer Science+Business Media, Inc.

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Keywords

Calixarene, Clathrate, Differential scanning calorimetry, Mass spectrometry, Molecular recognition, Polymorphism, Pseudo-polymorphism, Thermogravimetry