

Nonlinear effect of two remembered guests in their mixtures on the host memory for guest inclusion and release

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Abstract

© 2016 Akadémiai Kiadó, Budapest, Hungary Selective memory for volatile guests after their inclusion and removal is a smart property of calixarenes, which are capable to form metastable polymorphs. This property is practically unpredictable, particularly for guest mixtures. In the present work, the mutual influence of the two guests in their binary mixture on this effect for tert-butylcalix[6]arene was studied. The first example was found for an ability of two guests, benzene and tetrachloromethane, which can be remembered separately in binary host-guest systems, to erase the host memory to each of them forming a ternary clathrate with a much higher thermal stability than corresponding binary clathrates. Prepared mixed inclusion compounds perform a unique ability for fractional guest release on the separate steps of clathrate decomposition, which may be used for separation of pure volatile compounds from their mixtures. The clathrates were characterized by TG-DSC method combined with mass-spectrometric analysis of the evolved guest vapors and by X-ray powder diffractometry.

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Keywords

Calixarene, Clathrate, Host memory, Inclusion compounds, Simultaneous thermal analysis, Thermogravimetry