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Anti-sieve effect in guest inclusion by thiacalix[4]arene giving a surge in thermal stability of its clathrates prepared by solid-phase guest exchange

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Abstract

An unusual bell-like relationship between guest size parameter and properties of thiacalix[4]arene (1) clathrates was observed, which is a source of their very high thermal stability. For this, calixarene 1 clathrates were prepared in a binary 'solid host-guest vapor' system and by solid-phase exchange with guests of various molecular structure. The clathrates were studied by thermal analysis and X-ray powder diffractometry. Calixarene 1 was found to have a specific anti-sieve effect excluding smaller guest compounds, while having a preference for larger compounds. This effect may be avoided using solid-phase guest exchange in clathrate preparation, but it contributes greatly to the thermal stability of exchange products. This journal is © the Partner Organisations 2014.

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