The separation of close isomers by clathrate formation is industrially important because it is simple, efficient and is not energy intensive. The process relies on molecular recognition between host and guest molecules, and typically consists of dissolving an appropriate host compound in a mixture of two or more guests, allowing the formation of a crystalline inclusion compound which is enriched with respect to a particular guest. The inclusion compound is filtered and the enriched guest released by gentle washing, so that the host compound can be recycled. Depending on the selectivity of the process, separation of the targeted guest of >90% is usually achieved in at least three cycles.


Hexakis(3-hydroxy-3,3-diphenyl-2-propenyl)benzene (H) has proved to be a very versatile host including a number of small organic molecules via hydrogen bonding. Inclusion compounds of H have been found to form in various host:guest ratios, often considerably richer in guest than is usually observed for organic hosts. It includes a number of guests with carbonyl functions, for example methyl ethyl ketone (1:3), diethyl ketone (1:2) and cyclohexanone (1:3); as well as guests such as diethyl ether (1:2) and 1,4-dioxane (1:5).

However, on crystallization from 1,3-dioxolane, H selectively included a trace amount of 1,3-dioxolan-2-one from the solution. This ketone complex was characterized by single crystal diffraction, thermal analysis, nuclear magnetic resonance spectroscopy, and mass spectroscopy.