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Functionalized calix[8]arenes, synthesis and self-assembly on graphite

Zhang J., Podoprygorina G., Brusko V., Böhmer V., Janshoff A.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

With the intention of building hollow tubular structures by self-assembly, we have designed and successfully synthesized a series of calix[8]arene derivatives. Their phenolic units were functionalized in p-position by various groups which are able to interact via hydrogen bonding or π-π stacking. Ethynyl, amide, urea, or imide links were chosen for the covalent attachment of these functional groups, to ensure the adjustment of an optimal distance for their interaction. Two different kinds of nanostructures selfassembled on a highly oriented pyrolytic graphite (HOPG) surface were found by scanning force microscopy: parallel aligned nanorods in which the calixarene molecules are adsorbed edge-on on the graphite, providing evidence that these calix[8]arene derivatives stack in a tubular fashion, and micrometer long fiber bundles most probably composed of many nanorods. © 2005 American Chemical Society.

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