

Abstract Submitted
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Precise Tetrahedral Giant Molecules Based on Polyhedral Oligosilsesquioxane (POSS) Nano-atoms MINGJUN HUANG, the University, CHIH-HAO HSU, SHAN MEI, the University of Akron, WEN-BIN ZHANG, Peking University, STEPHEN Z.D. CHENG, the University of Akron — The assembly of building blocks with specific shape and symmetry in 3D space is a long-lasting topic in scientific research. If “nano-atoms” are placed on the apexes of a rigid polyhedron linker to form a larger faceted giant molecule, such molecules would amplify the symmetry of the linkers and result in giant polyhedra molecules. When four POSS cages are linked to the apex of a tetrahedron, we obtain a giant tetrahedron. Depending on the linkers, it can be a semi-rigid or a rigid giant polyhedron. An interesting approach is to utilize the sp^3 -carbon or adamantane core to introduce the Td symmetry, and utilize “click reaction” to connect four hydrophobic isobutyl-POSS (BPOSS) at four corners. Our preliminary results show that the giant tetrahedron Tetra-4BPOSS forms an interdigitated diamondoid structure. In these giant polyhedra, we can use different “nano-atoms” with different functional groups, which may also act as an additional factor to affect the final ordered structures. The progresses of our research lead to three hydrophobic and one hydrophilic HPOSS (HPOSS represents seven hydroxyl group functionalized POSS), and two hydrophobic BPOSS and two hydrophilic HPOSS.

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