Post-Synthetic Modification (PSM): En route to Novel Functional Macrocyclic Compound Construction

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The study of macrocyclic compounds is the precursor and also a hot spot of the development of supramolecular chemistry. Star macrocyclic molecules such as crown ether, acupoint ether, and cyclodextrin have shown their important scientific significance and wide application value in the fields of chemistry, materials science, life science, and molecular physics. They are a new generation of supramolecular host molecules, from calixarene to columnar aromatics, and new macrocyclic aromatic molecules have recently appeared. Macrocyclic aromatic hydrocarbons have adjustable size cavities, excellent host-guest properties, and good self-assembly properties, so they are widely used in the interdisciplinary fields of new materials, sensors, and drug transportation, showing important scientific research value and extensive Application prospects. In this subject, A new macrocyclic aromatic hydrocarbon molecule 2,2',4,4'tetramethoxyl biphen[3]arene (MeBP3) was efficiently prepared and used as a precursor to continue to build a functionally oriented macrocyclic aromatic hydrocarbon derivative 2,2',5,5'-tetrabromo-4,4',6,6'-tetramethoxy biphen[3]arene (BrMeBP3) with post-synthetic modification (PSM) strategy. Then further research on supramolecular chemistry will be carried out. This topic describes a method for preparing intermediate MeBP3 in extremely high yield (99%), then it was used as the precursor framework to design a new functionally oriented macrocyclic aromatic hydrocarbon derivative BrMeBP3. Finally, BrMeBP3 was prepared and characterized. BrMeBP3 is expected to be able to specifically recognize small molecules containing halogen bonds, and more novel macrocyclic aromatic hydrocarbon derivatives based on BrMeBP3 will be constructed and analyzed in furthur research.

Awards Won: