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Construction, functionalization and organization of dendrimer with conjugated backbones

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Dendrimers containing rigid conjugated backbones were prepared by a convergent method where the attachment of dendritic branches and the extension of phenylene-ethynylene units were alternatively manipulated on the structure of AB_2 substituted diphenylacetylene. These dendrimer structures were applied for the construction of nanoscale light-harvesting antennas and charge-separating systems. The conjugated network inside the dendritic structure was shown to play an important role not only as a scaffold for the precise arrangement of functional groups but also as a mediator in both the photoinduced energy- and electron-transfer processes. In addition, we report a novel methodology for the construction of nanoscale covalent assemblies with rigid conjugated backbones using dendrimers as modular building blocks. The method was successfully applied to construct a square assembly (diagonal distance of ca. 11 nm) and a linear octamer (48 nm). Spectroscopic measurements establish that the octamer prefers to have folded conformation. These examples demonstrate advantage of the dendrimer with conjugated backbones for the construction of nanoscale molecular devices.

Biography

Masatoshi Kozaki is an Associate Professor of Chemistry at the Graduate School of Science, Osaka City University. He received his DSc in 1994 from the Graduate University for Advanced Studies. He spent one year (1994–1995) at the University of Alabama and two years (1995–1997) at the University of South Carolina as a Postdoctoral Fellow. Subsequently, he was appointed Assistant Professor (1997) and later promoted to Associate Professor (2006) in the Department of Chemistry, Faculty of Science, Osaka City University. His current research interests include organic materials chemistry, particularly nanoscale artificial functional molecules.

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