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Nanostructure formation and functional properties of giant macrocyclic oligothiophenes

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Fully conjugated macrocyclic oligothiophenes are regarded as an infinite π-conjugated system with an inner cavity and have attracted considerable attention owing to their effective conjugation length and unusual electronic properties. These macrocycles sometimes self-organize to form molecular-based ordered materials which show interesting electronic and optoelectronic properties depending the ring size, conformation, and inner cavity. Thus, giant macrocycles self-aggregate in the solid state to form size-specific nanostructures reflecting their nanophase separation, and the increasing π-conjugation of macrocycles leads to an increase in the two-photon absorption cross section with magnitudes as high as 100 000 GM. Furthermore, the giant macrocycle behaves as a synthetic cyclic pigment comparable to the natural light-harvesting system. Supramolecular chemistry, nanostructure formation, and functional properties of giant conjugated macrocycles will be discussed in detail.

Biography

Masahiko Iyoda studied chemistry at Nagoya University (BS 1969, MS 1971) and completed his PhD (1974) in Organic Chemistry at Osaka University with Prof. Masazumi Nakagawa. After postdoctoral studies at Osaka University and the University of Cologne (with Prof. Emanuel Vogel), he returned to Osaka University in 1977 and became Assistant Professor in 1978. He became an Associate Professor in 1988, and in 1991, he became Full Professor at Tokyo Metropolitan University. His research interests include the synthesis of functional π-electron systems, the noncovalent synthesis of functional nanostructures, and their applications in materials science.

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