VII-L Precise Synthesis of Functional Macromolecules Using Organometallic Complexes

The helix is one of the most important and fundamental secondary structures of macromolecules and is closely related to the unique functionalities of biomacromolecules. This project focuses on the development of precise polymerization catalyzed by organometallic complexes providing novel functional macromolecules, in which not only molecular weight and sequence but also secondary structures are well controlled. We also examined the physical and chemical properties of the resulting helical polymers.

VII-L-1 Helical Poly(aryl isocyanide)s Possessing Chiral Alkoxycarbonyl Groups

TAKEI, Fumie[1]; HAYASHI, Hiroko[1]; ONITSUKA, Kiyotaka[2]; TAKAHASHI, Shigetoshi[1]
([1]Osaka Univ.; [2]Osaka Univ. and IMS)

[*Polymer J.* **33**, 310 (2001)]

The relation between the structure of chiral monomers and the selectivity of the screw sense of poly(aryl isocyanide)s having several kinds of chiral alkoxycarbonyl groups was determined. The selectivity of screw sense in the poly(aryl isocyanide)s depends on the some structural factors including the position of chiral substituents on aromatic rings, the position of stereogenic center, and the bulkiness of chiral groups.

VII-L-2 Formation of an Optically Active Helical Polyisocyanide Langmuir-Blodgett Film

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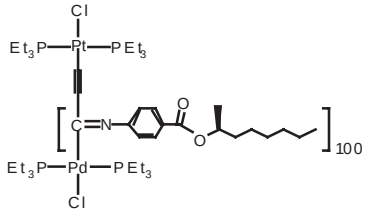
[*Chem. Lett.* 764 (2001)]

An optically active helical polyisocyanide synthesized with a screw-sense selective living polymerization formed a condensed monolayer on the water surface and was transferred onto a solid support as Y-type LB film with an ordered orientation.



VII-L-3 Helical Chiral Polyisocyanides Possessing Porphyrin Pendants: Determination of Helicity by Exciton Coupled Circular Dichroism

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[*Angew. Chem., Int. Ed.* **40**, 4092 (2001)]

A novel and practical method for determining the helical sense of poly(aryl isocyanide)s has been developed by using exciton coupled CD of the porphyrin Soret band in triblock copolymers between chiral isocyanide monomers and an achiral tetraphenylporphyrin derivative.