VII-I Synthesis and Functionality of Organometallic Dendrimers

Dendrimers are three-dimensional macromolecules with regularly hyperbranched structures, and have a wide range of potentials applicable to new functional materials. Organometallic dendrimers have attracted much attention due to their unique functions based on photochemical, redox and catalytic behaviors. This project focuses on the development of new synthetic routes toward the dendrimers that consist of organometallic species in every generation. We also examine the physical and chemical properties of these organometallic dendrimers.

VII-I-1 Living Polymerization of Aryl Isocyanides by Multifunctional Initiators Containing Pd–Pt μ-Ethynediyl Units

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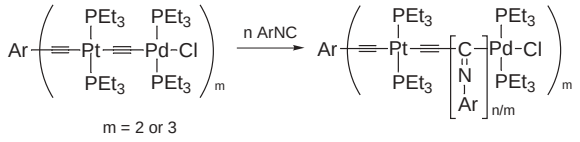
([1]Osaka Univ.; [2]Osaka Univ. and IMS)

[*Chem. Lett.* 786 (2000)]

Multinuclear acetylide complexes containing two or three Pd–Pt μ-ethynediyl units have been prepared and successfully applied to a multifunctional initiator for the living polymerization of aryl isocyanides, which gives two- or three-armed poly(isocyanide)s with a narrow polydispersity index in good yields.



VII-I-2 Synthesis of Hyperbranched Platinum-Poly(yne) Polymers by Self Polycondensation

ONITSUKA, Kiyotaka[2]; OHSHIRO, Nobuaki[1]; FUJIMOTO, Masanori[1]; TAKEI, Fumie[1]; TAKAHASHI, Shigetoshi[1]
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[*Mol. Cryst. Liq. Cryst.* **342**, 159 (2000)]

A hyperbranched polymer constructed by platinum-acetylide units has been synthesized by self polycondensation of a dinuclear platinum complex having one terminal acetylene and two platinum-chloride groups as an AB_2 monomer in the presence of a copper catalyst in amine. The hyperbranched polymer is soluble in common organic solvents and characterized by means of spectral analyses and GPC.

VII-I-3 Synthesis of Organometallic Dendrimers by Ligand Exchange Reactions: Reversible Bonding of Dendrons to a Core in Transition Metal Acetylide Dendrimers

ONITSUKA, Kiyotaka[2]; IUCHI, Asako[1]; FUJIMOTO, Masanori[1]; TAKAHASHI, Shigetoshi[1]
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[*Chem. Commun.* 741 (2001)]

Ligand exchange reactions of chloride ligands on a trinuclear palladium acetylide core with platinum acetylide dendrons having a 4-pyridyl group at a focal point result in the quantitative formation of novel organometallic dendrimers, which easily revert to the core and the dendrons by treatment with Bu_4NCl.