

Prof. **Masa-aki KAKIMOTO**

Graduate School of Science and Engineering
 Department of Organic
 and Polymeric Materials



Contact: Tel:03-5734-2433; Fax:03-5734-2875 mkakimot@o.cc.titech.ac.jp
 Lab HP: <http://www.op.titech.ac.jp/kakimoto/vacha/index.html>

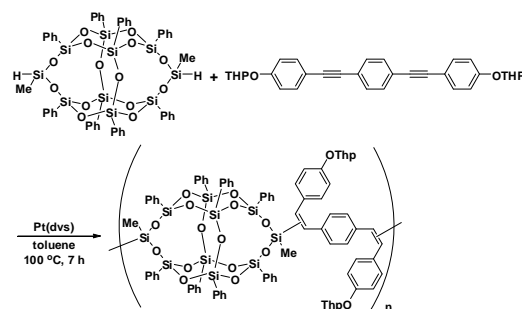
Research field: Polymer Synthesis, Functional Polymers

Research topics conducted within the G-COE project

1. Topics 1

Synthesis of Low Dielectric Constant High Temperature Polymers

With increasing LSI, low dielectric constant polymers with high thermal stability are required. We develop new polymers that have double-decker type caged polysiloxane (DDSQ) in main chain.



Low Dielectric Constant High Temperature Polymers

2. Topics 2

Development of Ion Exchange Membrane for Fuel Cell

Fuel cells are a kind of electric generators from oxygen and hydrogen. Fuel cells need special membranes that make proton go through selectively. We develop new proton exchange membrane using hybrid of hyperbranched and linear polymers.

3. Topics 3

Synthesis of Hyperbranched Phthalocyanine (HBPh) Having High Dielectric Constant

Organic materials having high dielectric constant are paid attention for applications such as flexible capacitor and hole injection layer in OLEDs. We develop HBPh that have dielectric constant of 46. This value is extremely high because the dielectric constant of usual polymers is from 2.5 to 4. HBPh has applied to embedded device with high dielectric constant inorganic filler.

Representative publications

Synthesis and characterization of semiaromatic polyimides containing POSS in main chain derived from double-decker-shaped silsesquioxane, Shouming Wu, Teruaki Hayakawa, Ryohei Kikuchi, Steohen J. Grunzinger, Masa-aki Kakimoto, Hisao Oikawa, *Macromolecules*, 40, 5698-5705 (2007)

Hydrosilylation polymerization of double-Decker-shaped silsesquioxane having hydrosilane with diynes, Makoto Seino, Teruaki Hayakawa, Yoshihito Ishida, Masa-aki Kakimoto, Kenichi Watanabe, and Hisao Oikawa, *Macromolecules*, 39, 3473-3475 (2006)

High frequency dielectric response in a branched phthalocyanine, Meng Guo, Xingzhong Yan, Young Kwon, Teruaki Hayakawa, Masa-aki Kakimoto, and Theodore Goodson III, *J. Am. Chem. Soc.*, 128, 14820-14821 (2006)

Polymer-ceramic nanocomposites based on new concepts for embeded capacitor, Masa-aki Kakimoto, Akio Takahashi, Takaki Tsurumi, Jianjun Hao, Li Li, Ryohei Kikuchi, Takao Miwa, Toshiyuki Oono, Shinji Yamada, *Materials Sci. Eng.*, B 132, 74-78 (2006)