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1. Main Research Results

- 1) High thermal conductive materials: Polymers that had molecular orientation were obtained by polymerization of monomers having liquid crystalline unit. The obtained polymers had about three times higher thermal conductivity compared with usual polymers.
- 2) Preparation of block copolymers aiming nanofabrication for LSI devices: Block copolymers containing silan unit were prepared and the structure was clarified in detail. The goal of this project is to establish 10 nm level fabrication using self assembly in the block copolymers.
- 3) Oxidation of alcohols using carbon alloy catalysts: Benzaldehyde was selectively obtained from benzyl alcohol by aerobic oxidation in the presence of carbon alloy catalysts and nitric acid.

2. List of publication (original article, comment/book)

1) Original Paper

- (1) Synthesis and degree of branching of epoxy-terminated hyperbranched polysiloxysilane, Kazutoshi Yokomachi, Makoto Seino, Stephen J. Grunzinger, Teruaki Hayakawa, and Masa-aki Kakimoto, *Polym. J.*, 40, 198-204 (2008)
- (2) Spin-coated highly efficient phosphorescent organic light-emitting diodes based on bipolar triphenylamine-benzimidazole derivatives, Ziyi Ge, Teruaki Hayakawa, Shinji Ando, Mitsuru Ueda, Toshiyuki Akiike, Hidetoshi Miyamoto, Toru Kajita, and Masa-aki Kakimoto, *Adv. Funct. Mater.*, 18, 584-590 (2008)
- (3) Solution-processible bipolar triphenylamine-benzimidazole derivatives for highly efficient single-layer organic light-emitting diodes, Ziyi Ge, Teruaki Hayakawa, Shinji Ando, Mitsuru Ueda, Toshiyuki Akiike, Hidetoshi Miyamoto, Toru Kajita, and Masa-aki Kakimoto, *Chem. Mater.*, 20, 2532-2537 (2008)
- (4) Synthesis and characterization of organosoluble polysiloxaneimides derived from siloxane-containing aliphatic dianhydride and various aromatic diamines, Shouming Wu, Teruaki Hayakawa, Masa-aki Kakimoto, *High Perform. Polym.*, 20, 281-295 (2008)
- (5) Synthesis of multiblock hyperbranched-linear poly(ether sulfone) copolymers
- (6) Stephen J. Grunzinger, Teruaki Hayakawa, and Masa-aki Kakimoto, *J. Polym. Sci.:Part A: Polym. Chem.*, 46, 4785-4793 (2008)
- (7) Spin-Assembled Nanolayer of a Hyperbranched Polymer on the Anode in Organic Light-Emitting Diodes: The Mechanism of Hole Injection and Electron Blocking, Tae-Woo Lee, Jong-Jin Park, Young Kwon, Teruaki Hayakawa, Tae-Lim Choi, Jong Hyeok Park, Rupasree Ragini Das, and Masa-aki Kakimoto, *Langmuir*, 24, 12704-12709 (2008)
- (8) Double Ordered Layers within Microphase-separated Lamellar Structure of Double

Liquid Crystalline Side-chain Type Block Copolymer, Rina Maeda, Teruaki Hayakawa, Masatoshi Tokita, Masa-aki Kakimoto, and Hiroaki Urushibata, Chem. Lett., 37, 1174-1175 (2008)

3. Invited/Plenary Talks in Conference

1) International Conference or Workshop

3 for oral presentation

8 for poster presentation

2) Domestic Conferences

16 for oral presentation

5 for poster presentation

4. Patent

6 application

5. Others

1) International Collaboration

Core University Program between Tokyo Institute of technology and Korea Advanced Institute of Science and Technology