Masahiro TERAGUCHI, Dr. Eng.

Assistant Professor
Program: Advanced Materials Science and Technology
Area: Applied Chemistry and Chemical Engineering
Undergraduate: Dept. of Chemistry and Chemical Engineering

Professional Expertise

My professional expertise is to polymer chemistry including synthesis of functional polymers, for example, conjugated polymers, optically active polymers and molecularly imprinting polymers, and polymer membranes for optical resolution and gas separation. Our research group has found new monomers and polymerization method such as helix-sense-selective polymerization of substituted acetylenes and found new permselective membranes such as optical resolution membranes.

Research Fields of Interest

1) Synthesis of functional polymers: Gas permeable polymers, Conjugated polymers; Polymer catalyst; Optically active polymers
2) Polymer reaction in membrane state: Molecularly imprinting polymer; Surface modification
3) Separation Membranes: Gas permselective membranes; Optical resolution membranes

Education

2000: Ph.D. in Engineering, Department of Polymer Chemistry Graduate School of Engineering, Kyoto University, Japan
1997: M.S. in Engineering, Department of Polymer Chemistry, Graduate School of Engineering, Kyoto University, Japan
1995: B.S. in Science, Faculty of Science, Department of Chemistry, Kochi, University, Japan

Professional Societies and Activities

1. The Society of Polymer Science, Japan
2. The Chemical Society of Japan
3. The Membrane Society of Japan

Awards

Award for Encouragement of Research in Polymer Science; The Society of Polymer Science, Japan, 2003

Major Publications

Papers

[1] "Helix-sense-selective Polymerization of Substituted Acetylenes by Using an Isolated Rh Chiral Initiator with an Amino Acid Ligand", Yu Zang, Tomoyuki Ohishi, Toshiki Aoki, Masahiro Teraguchi, Takashi Kaneko, *Chem. Lett.* **2013**, *42(4)*, 430-432.

[2] "Living-like helix-sense-selective polymerization of an achiral substituted acetylene having bulky substituents", Yu Zang, Kazuki Nakao, Hiroki Yotsuyanagi, Toshiki Aoki, Takeshi Namikoshi, Toyokazu Tsutsuba, Masahiro Teraguchi, Takashi Kaneko, *Polymer (communication)*, **2013**, *54(7)*, 1729-1733.

[3] Helix-Sense-Selective Polymerization of Achiral Acetylene Monomer Catalyzed by Rh Zwitterionic Complexes with Tethered Chiral Amino/Ether Groups", Fumio Sanda, Naoya

Onishi, Toshiki Aoki, Takashi Kaneko, Masahiro Teraguchi, Natsuhiro Sano, Toshio Masuda, Masashi Shiotsuki, *Chem. Lett.* **2013**, *42(3),* 278-280.

[4] "Top-down preparation of self-supporting supramolecular polymeric membranes using highly selective photocyclic aromatization of cis-cisoid helical poly(phenylacetylene)s in the membrane state", Lijia Liu, Takeshi Namikoshi, Yu Zang, Toshiki Aoki, Shingo Hadano, Yunosuke Abe, Ikuya Wasuzu, Toyokazu Tsutsuba, Masahiro Teraguchi,Takashi Kaneko, *J. Am. Chem. Soc.* **2013**, *135(2)*, 602-605.

[5] "Helix-Sense-Selective Polymerization of Achiral Phenylacetylenes with Two N-Alkylamide Groups to Generate the One-Handed Helical Polymers Stabilized by Intramolecular Hydrogen Bonds", Teraguchi, M.; Tanioka, D.; Kaneko, T.; Aoki, T., *ACS Macro. Lett.* **2012**, *1*, 1258-1261.

[6] "Enhanced Gas Permselectivity of Copoly(Hyperbranched Macromonomer) Synthesized by One-pot Simultaneous Copolymerization of Dimethylsilyl-containing Phenylacetylenes", Li, J.; Wang, J.; Zang, Y.; Aoki, T.; Kaneko, T.; Teraguchi, M., *Chem. Lett.* **2012**, *41(11),* 1462-1464.

[7] "Two Modes of Asymmetric Polymerization of Phenylacetylenes Having an L-Amino Alcohol Residue and Two Hydroxy Groups", Jia, H.; Zang, Y.; Li, J.; Aoki, T.; Teraguchi, M.; Kaneko, T., *J. Polym. Sci., Part A: Polym. Chem.* **2012**, *50(24),* 5134-5143.

[8] "Polymerization of Phenylacetylene-based Monodendrons with Alkoxy Peripheral Groups and Oxygen/Nitrogen Permeation Behavior of Their Membranes", Kaneko, T.; Sato, K.; Uchiya, Y.; Teraguchi; M. Aoki, T., *Int. J. Polym. Sci.* **2012**, doi:10.1155/2012/974204.

[9] "Transformation from Preformed Racemic Helical Poly(phenylacetylene)s to The Enantioenriched Helical Polymers by Chiral Solvation, Followed by Removal of The Chiral Solvents", Kaneko, T.; Liang, X.; Kawami, A.; Sato, M.; Namikoshi, T.; Teraguchi, M.; Aoki, T., *Polym. J.* **2012**, *44*, 327-333.

[10] "Pseudo Helix-sense-selective Polymerization of Achiral Substituted Acetylenes", Zang, Y.; Aoki, T.; Liu, L.; Abe, Y.; Kakihana, Y.; Teraguchi, M.; Kaneko T., *Chem. Commun.* **2012**, *48*(39), 4761-4763.

[11] "Synthesis of Stable and Soluble One-handed Helical Poly(substituted acetylene)s without Chiral Pendant Groups via Polymer Reaction in Membrane State", Abe, Y.; Aoki, T.; Jia, H.; Hadano, S.; Namikoshi, T.; Kakihana, Y.; Liu, L.; Zang, Y.; Teraguchi, M.; Kaneko, T., *Polymer(communications)* **2012**, *53*, 2129-2133.

[12] "Chiral Teleinduction in Asymmetric Polymerization of 3, 5-Bis(hydroxymethyl)phenylacetylene Having a Chiral Group via a Very Long and Rigid Spacer at 4-Position", Abe, Y.; Aoki, T.; Jia, H.; Hadano, S.; Namikoshi, T.; Kakihana, Y.; Liu, L.; Zang, Y.; Teraguchi, M.; Kaneko, T., , *Chem. Lett.* **2012**, *41*(3), 244-246.

[13] Abe, Y., Aoki, T.; Jia, H.; Hadano, S.; Namikoshi, T.; Kakihana, Y.; Liu, L.; Zang, Y.; Teraguchi, M.; Kaneko, T., "Synthesis of Stable and Soluble One-handed Helical Homo-poly(substituted acetylene)s without the Coexistence of any Other Chiral Moieties via Two-step Polymer Reactions in Membrane State: Molecular Design for the Starting Monomer", *Molecules* **2012**, *17*(1), 433-451.

[14] "Enantioselective Pervaporation through Membranes from Poly(1,3-phenyleneethynylenes)-based One-handed Helical Foldamer and Unfoldamer", Inoue, M.; Teraguchi, M.; Aoki, T.; Namikoshi, T.; Marwanta, E.; Kaneko, T., *Chem. Lett.* **2011**, *40(4)*, 384-386.

[15] "New Achiral Phenylacetylene Monomers Having an Oligosiloxanyl Group Most Suitable for Helix-Sense-Selective Polymerization and for Obtaining Good Optical Resolution Membrane Materials", Liu, L.; Zang, Y.; Hadano, S.; Aoki, T.; Teraguchi, M.; Kaneko, T.; Namikoshi, T., *Macromolecules* **2010**, *43(22)*, 9268-9276.

[16] "Three Mechanisms of Asymmetric Polymerization of Phenylacetylenes Having an l-Amino Ether Residue and Two Hydroxy Groups", Hongge, J.; Teraguchi, M.; Aoki, T.; Abe, Y.; Kaneko, T.; Hadano, S.; Namikoshi, T.; Ohishi, T., *Macromolecules* **2010**, *43(20)*, 8353-8362.

[17] "Synthesis and helix-sense-selective polymerization of a novel phenylacetylene having a trisiloxanyl group and two hydroxyl groups and enantioselective permeability of the resulting chiral polymeric membrane: Effect of the trisiloxanyl group on the polymerization and enantioselective permeability", Liu, L.; Oniyama, Y.; Zang, Y.; Hadano, S.; Aoki, T.; Teraguchi, M.; Kaneko, T.; Namikoshi, T.; Marwanta, E., *Polymer* **2010**, *51(12)*, 2460-2464.

[18] "Helix-sense-selective Polymerization of Achiral Bis(hydroxymethyl)phenylacetylenes Bearing Alkyl Groups of Different Lengths", Hadano, S.; Kishimoto, T.; Hattori, T.; Tanioka, D.; Teraguchi, M.; Aoki, T,; Kaneko, T.; Namikoshi, T.; Marwanta, E., *Macromol. Chem. Phys.* **2009**, *210(9)*, 717-727.

[19] "Optically Active Helical Structure and Magnetic Interaction of Poly(phenylacetylene)-based Polyradicals", Kaneko, T.; Katagiri, H.; Umeda, Y.; Namikoshi, T.; Marwanta, E.; Teraguchi, M.; Aoki, T., *Polyhedron* **2009**, *28(9-10)*, 1927-1929.

[20] "Phenyleneethynylene Macrocycle-fused Phenylacetylene Monomers: Synthesis and Polymerization", Kaneko, T.; Horie, T.; Matsumoto, S.; Teraguchi, M.; Aoki, T., *Macromol. Chem. Phys.* **2009**, *210(1)*, 22-36.

[21] "Synthesis of Poly(1,3-phenyleneethynylenes) Membranes having One-Handed helical Conformation without Any Chiral Side Groups by In-Situ Desubstitution of D-menthoxy groups", Inoue, M.; Teraguchi, M.; Aoki, T.; Hadano, S.; Kaneko, T., *Synth. Met.* **2009**, *159,* 854–858.