



## グローバル COE 物質科学イノベーション講演会

演 題 : Molecular Design, Precise Synthesis, and Application of Poly(N-isopropylacrylamide) Derivatives as Thermoresponsive Materials

講 師 : Professor Qian Duan  
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日 時 : 2012 年 2 月 16 日 (木) 14:45 ~ 15:45

場 所 : 北海道大学工学部材料・化学棟大会議室 (MC526)

共 催 : 高分子学会北海道支部

要 旨 : This lecture presents the synthesis for a series of well-defined, stimuli-responsive diblock copolymers composed of poly(N-isopropylacrylamide) and poly(6-[4-(4-methoxyphenylazo)phenoxy]hexyl methacrylate) using atom transfer radical polymerization and click chemistry. The diblock copolymers were characterized by nuclear magnetic resonance spectroscopy, Fourier transform infrared spectroscopy, and gel permeation chromatography. The aqueous solutions of the polymers exhibited a lower critical solution temperature (LCST) that depended on the amount of incorporated azobenzene. Higher LCSTs were observed after UV irradiation, with a maximum difference of 4.1 °C for the copolymer containing 1.4mol% azobenzene groups. The photochemical properties of the polymer were also studied by UV-vis spectroscopy.

- 1) Z. Gao, J. Liang, X. Tao, Y. Cui, T. Satoh, T. Kakuchi, Q. Duan, Synthesis of star-shaped poly(N-isopropylacrylamide) via atom transfer radical polymerization and its photocatalytic oxidation of Rhodamine B, *Macromolecular Research*
- 2) X. Tao, Z. Gao, T. Satoh, Y. Cui, T. Kakuchi, Q. Duan, Synthesis and characterization of well-defined thermo- and light-responsive diblock copolymers by atom transfer radical polymerization and click chemistry, *Polym. Chem.*, **2**, 2068 – 2073 (2011)
- 3) X. Tao, R. Zhang, Z. Gao, T. Satoh, T. Kakuchi, Q. Duan, Synthesis and property study on Eu(III) complexes of modified poly(N-isopropylacrylamide), *J Mater Sci.*, **46**, 6396 – 6401 (2011)
- 4) Q. Duan, A. Narumi, Y. Miura, X. Shen, S. Sato, T. Satoh, T. Kakuchi, Thermoresponsive Property Controlled by End-Functionalization of Poly(N-isopropylacrylamide) with Phenyl, Biphenyl, and Triphenyl Groups, *Polym. J.*, **38**, 306 – 310 (2006)
- 5) Q. Duan, Y. Miura, A. Narumi, X. Shen, T. Satoh, T. Kakuchi, Synthesis and Thermoresponsive Property of End-Functionalized Poly(N-isopropylacrylamide) with Pyrenyl Group, *J. Polym. Sci., Part A: Polym. Chem.*, **44**, 1117 – 1124 (2006)

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連絡先 : 北海道大学工学部生物機能高分子部門  
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