CURRICULUM VITAE – Dr. Atsushi Shimojima

PERSONAL

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EDUCATION

B.Sc.	Waseda University, Tokyo, 1995
M. Sc.	Waseda University, Tokyo, 1997
Ph. D.	Waseda University (Prof. Kazuyuki Kuroda), Tokyo, 2002

PROFESSIONAL CAREER

Researcher	Showa Denko K. K. (Chemical company), 1997-1998
JSPS research fellow(PD)	Waseda University (Prof. Kazuyuki Kuroda), 2002-2003
Visiting researcher	UC Santa Barbara (Prof. Galen D. Stucky), 2004
CREST researcher	Waseda University (Prof. Kazuyuki Kuroda), 2005
Assistant Professor	The University of Tokyo, 2006-2007
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RESEARCH INTERESTS

(1) Functional Hybrid Materials
(2) Mesoporous Materials
(3) Self-Assembly Processes

RECENT SELECTIVE PUBLICATIONS

1. N. Sato, Y. Kuroda, T. Abe, H. Wada, A. Shimojima, K. Kuroda, "Regular Assembly of Cage Siloxanes by Hydrogen Bonding of Dimethylsilanol Groups", *Chem. Commun.*, **2015**, 51, 11034.
2. S. Sakamoto, Y. Tamura, H. Hata, Y. Sakamoto, A. Shimojima, K. Kuroda, "Molecularly Designed Nanoparticles by Dispersion of Self-assembled Organosiloxane-based Mesophases", *Angew. Chem. Int. Ed.*, **2014**, 53, 9173.
3. K. Kuroda, A. Shimojima, K. Kawahara, R. Wakabayashi, Y. Tamura, Y. Asakura, M. Kitahara, Utilization of Alkoxysilyl Groups for the Creation of Structurally Controlled Siloxane-Based Nanomaterials, *Chem. Mater.*, **2014**, 26, 211. (Review)
4. S. Guo, A. Sugawara-Narutaki, T. Okubo, A. Shimojima, "Synthesis of Ordered Photoresponsive Azobenzene–Siloxane Hybrids by Self-assembly", *J. Mater. Chem. C*, **2013**, 1, 6989.
5. N. Koike, T. Ikuno, T. Okubo, A. Shimojima, "Synthesis of Monodisperse Organosilica Nanoparticles with Hollow iInteriors and Porous Shells Using Silica Nanospheres as Templates", *Chem. Commun.*, **2013**, 49, 4998.
6. Y. Wada, K. Iyoki, A. Sugawara-Narutaki, T. Okubo, A. Shimojima, "Diol-Linked Microporous Networks of Cubic Siloxane Cages", *Chem. Eur. J.*, **2013**, 19, 1700.
7. W. Chaikittisilp, M. Kubo, T. Moteki, A. Sugawara-Narutaki, A. Shimojima, T. Okubo, "Porous Siloxane–Organic Hybrid with Ultrahigh Surface Area through Simultaneous Polymerization–Destruction of Functionalized Cubic Siloxane Cages ", *J. Am. Chem. Soc.*, **2011**, 133, 13832.
8. W. Chaikittisilp, A. Sugawara, A. Shimojima, T. Okubo, "Microporous Hybrid Polymer with a Certain Crystallinity Build from Functionalized Cubic Siloxane Cages as a Singular Building Unit", *Chem. Mater.*, **2010**, 22, 4841.

BUILDING-BLOCK ASSEMBLY TOWARD FUNCTIONAL SILOXANE-BASED NANOMATERIALS

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ABSTRACT

Inorganic–organic hybrid materials have extensively studied because of their structural and compositional varieties leading to many applications. Organosiloxane-based materials, having various organic groups attached to siloxane (Si-O-Si) networks by Si-C bonds, are important class of hybrid materials with high stability and high transparency along with diverse functionalities endowed by organic moieties. Bottom-up assembly of molecular building blocks is a promising approach to well-defined hybrid architectures. In this paper, recent progress in the design of nanohybrid materials based on the controlled assembly of organosilane and organosiloxane molecules will be presented. Over the past decade, we have established the formation of various hybrid mesostructures, including lamellar, 2D hexagonal, and cubic structures, by self-assembly of amphiphilic alkylsilane and alkyl-oligosiloxane molecules. Recently, a unique photo-responsive material has been successfully obtained by incorporation of azobenzene groups instead of simple alkyl chains. Lamellar azobenzene-siloxane hybrids assembled from the mixture of two types of organoalkoxysilanes containing bridging- and pendant-azobenzene groups were found to show reversible bending and unbending behaviors upon UV/Vis irradiations. On the other hand, core-shell organosiloxane nanoparticles as small as ~3 nm in diameter have been obtained by dispersion of reverse-type mesostructures assembled form linear oligosiloxane molecules bearing a bulky trialkylsilyl group. In situ encapsulation of fluorescent dyes into the nanoparticles demonstrated their ability to function as nanocarriers. Another topic will be the construction of novel nanoporous materials by interconnection of cage-type oligosiloxanes. Our recent efforts on the regular assembly of cubic siloxane cages will be presented.

KEYWORDS: Self-assembly, Inorganic-organic hybrid, nanomaterials, siloxne