

医工薬融合 GCOE Seminar Series

Center for Medical System Innovation
through Multidisciplinary Integration
The University of Tokyo

Simple Strategies to Produce Complex Non-toxic Anti-biofouling Coatings

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Date: Friday, December 14, 2012

Time: 16:00 - 17:30

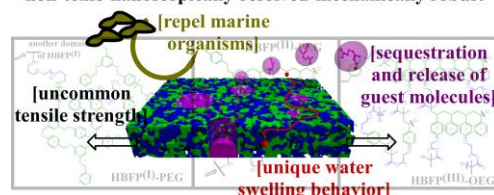
Venue: #429, 4F, Faculty of Engineering, Bldg.14, the University of Tokyo



This presentation will detail amphiphilic nanostructured material systems, constructed from a general methodology that involves the kinetic, in situ crosslinking of thermodynamically-driven phase segregated states of polymer assemblies. Macroscopic crosslinked networks comprised of amphiphilic nanodomains presented on the surface

and dispersed throughout the material are obtained by crosslinking of the assemblies in bulk samples. Of particular interest for these materials are the complex surface topographies and morphologies that allow for the materials to exhibit anti-biofouling characteristics, passively and also with enhancement provided by covalent functionalization with active deterrent molecules.

Idealized HBFP-PEG Amphiphilic Crosslinked Networks
non-toxic•nanoscopically-resolved•mechanically robust



(a) Imbesi, P. M.; Finlay, J. A.; Aldred, N.; Eller, M. J.; Felder, S. E.; Pollack, K. A.; Lonnecker, A. T.; Raymond, J. E.; Mackay, M. E.; Schweikert, E. A.; Clare, A. S.; Callow, J. A.; Callow, M. E.; Wooley, K. L. "Targeted Surface Nanocomplexity: Two-dimensional control over the composition, physical properties and anti-biofouling performance of hyperbranched fluoropolymer – poly(ethylene glycol) amphiphilic crosslinked networks", *Polym. Chem.*, 2012, 3(11), 3121-3131. (b) Gudipati, C. S.; Greenlief, C. M.; Johnson, J. A.; Prayongpan, P.; Wooley, K. L. "Hyperbranched Fluoropolymer (HBFP) and Linear Poly(ethylene glycol) (PEG) Based Amphiphilic Crosslinked Networks as Efficient Anti-fouling Coatings: An insight into the surface compositions, topographies and morphologies", *J. Polym. Sci., Part A: Polym. Chem.*, 2004, 42(24), 6193-6208. (c) Gan, D.; Mueller, A.; Wooley, K. L. "Amphiphilic and Hydrophobic Surface Patterns Generated from Hyperbranched Fluoropolymer (HBFP)-Linear Polymer Networks: Minimally-adhesive coatings via crosslinking of hyperbranched fluoropolymers", *J. Polym. Sci., Part A: Polym. Chem.*, 2003, 41(22), 3531-3540.

Gudipati, C. S.; Finlay, J. A.; Callow, J. A.; Callow, M. E.; Wooley, K. L. "The Anti-fouling and Fouling-release Performance of Unique Hyperbranched Fluoropolymer (HBFP)-Poly(ethylene glycol) (PEG) Composite Coatings Evaluated by Protein Adsorption and the Settlement of zoospores of the Green Fouling Alga *Ulva* (syn. *Enteromorpha*)", *Langmuir*, 2005, 21(7), 3044-3053.

Imbesi, P. M.; Gohad, N. V.; Eller, M. J.; Orihuela, B.; Rittschof, D.; Schweikert, E. A.; Mount, A. S.; Wooley, K. L. "Noradrenaline-functionalized Hyperbranched Fluoropolymer-Poly(ethylene glycol) Crosslinked Networks as Dual-mode, Anti-biofouling Coatings", *ACS Nano*, 2012, 6(2), 1503-1512.

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