THE UNIVERSITY OF TOKYO

COINS Seminar #4

"Block Copolymers featuring Polyelectrolyte Segments: Building Blocks for Advanced Micellar Engineering"

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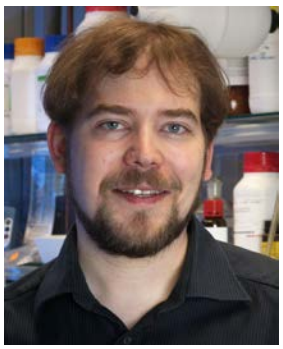
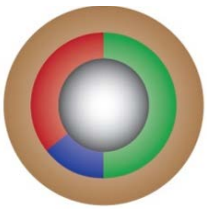
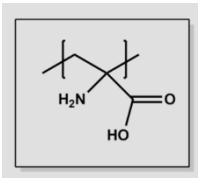


Date: November 13, 2014
Time: 17:30 pm ~ 18:30 pm
Venue: Room #56, Engineering building#5, The University of Tokyo

—Abstract—

Block copolymers represent a unique class of materials for the generation of nanostructured materials in different environments – mainly driven by the inherent immiscibility of unlike building blocks.[1] Our focus is put on materials, which contain at least one polyelectrolyte or polyampholyte segment. Such materials are highly interesting with regard to directed assembly processes, e.g. *via* the formation of interpolyelectrolyte complexes. During this presentation, the following examples will be addressed: ***(1) the self-assembly of ampholytic triblock terpolymers***, polybutadiene-*block*-poly(methacrylic acid)-*block*-PDMAEMA (PB-*b*-PMAA-*b*-PDMAEMA), results in soft and patchy micelles which are capable of undergoing structural rearrangements depending on pH and salinity. These can be used as superior non-viral transfection agents, outperforming even the "gold standard" poly(ethylene imine) (PEI)[2]; ***(2)*** motivated by the fact that precise control over charge balance in ampholytic triblock terpolymers is not straightforward, we designed a small library of ABC triblock terpolymers based on polyethers. Here, A and C are identical, only block B differs regarding side chain, charge, or solubility. With these materials at hand, we start exploring possibilities for ***co-assembly strategies towards core-shell-corona micelles*** where charge, charge density, and composition of the shell can be purposefully varied.[3] ***(3) the use of polydehydroalanine as zwitterionic building block*** featuring a very high charge density, with both charges being located directly at the polymeric backbone. Starting from monomer synthesis and polymerization,[4] we present first results regarding the use of PDha as coating for hybrid particles, material for electrospinning, or as building block in polymers of different architecture..





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