EuroSciCon

3rd Edition of International Conference and Exhibition on

Polymer Chemistry

March 26-28, 2018
Vienna, Austria

Eri Yoshida, Polym Sci, Volume 4
DOI: 10.4172/2471-9935-C1-008

GIANT VESICLES SUPPORTING AMINO GROUPS ON THE HYDROPHILIC SHELLS PREPARED BY PHOTO-CONTROLLED/LIVING RADICAL POLYMERIZATION-INDUCED SELF-ASSEMBLY OF AMPHIPHILIC BLOCK COPOLYMERS

Eri Yoshida
Toyohashi University of Technology, Japan

Micro-sized giant vesicles are a possible artificial model of biomembrane for cells and organelles, such as erythrocytes, mitochondria, and chloroplasts based on the similarities in size and structure. In recent years, a novel artificial biomembrane model has been established using giant vesicles comprised of amphiphilic poly(methacrylic acid)-block-poly(methyl methacrylate-random-methacrylic acid) diblock copolymers. The polymer giant vesicles had some similarities to biomembrane, not only in size and structure but also in the formation mechanisms, morphological transformation, membrane permeability, and stimulus-responsiveness. This paper describes the preparation and morphological transformation of new giant vesicles supporting amino groups on the hydrophilic shells through the nitroxide-mediated photo-controlled/living radical polymerization (photo-NMP)-induced self-assembly, with the aim of establishing an artificial model more suitable to biomembrane. The giant vesicles were prepared by the block copolymerization of a methacrylate ester supporting an amino group and methyl methacrylate using the photo-NMP technique in methanol at room temperature by irradiation with a high-pressure UV lamp. The photo-NMP-induced self-assembly produced spherical vesicles with the hydrophilic phase of the amine-containing polymethacrylate blocks and the hydrophobic core of the poly(methyl methacrylate) blocks. The size and morphology of the vesicles were dependent on the lengths of the hydrophilic and hydrophobic blocks of the copolymers. It was found that the vesicles were pH-sensitive and disrupted in an acidic solution. Their thermo-responsive behavior will be also described.

Recent Publications

1. E Yoshida (2017) Fabrication of anastomosed tubular networks developed out of fenestrated sheets through thermo responsiveness of polymer giant vesicles. ChemXpress 10(1):118.
2. E Yoshida (2015) Enhanced permeability of rhodamine B into bilayers comprised of amphiphilic random block copolymers by incorporation of ionic segments in the hydrophobic chains. Colloid Polym. Sci., 293: 2437.
3. E Yoshida (2015) PH response behavior of giant vesicles comprised of amphiphilic poly(methacrylic acid)-block-poly(methyl methacrylate-random-methacrylic acid). Colloid Polym. Sci. 293: 649.
4. E Yoshida (2014) Morphology control of giant vesicles by manipulating hydrophobic-hydrophilic balance of amphiphilic random block copolymers through polymerization-induced self-assembly. Colloid Polym. Sci. 292:763.
5. E Yoshida (2013) Giant vesicles prepared by nitroxide-mediated photo-controlled/living radical polymerization-induced self-assembly. Colloid Polym. Sci. 291:2733

Biography

Eri Yoshida is an Associate Professor at Toyohashi University of Technology. She received her Bachelor's Degree in Education from Tokyo Gakugei University and her PhD in Polymer Engineering from Tokyo Institute of Technology. After she obtained her PhD, she joined Kyoto Institute of Technology as an Assistant Professor. She also worked as a Visiting Scientist at the University of North Carolina at Chapel Hill. She has more than 100 peer reviewed scientific publications and 24 patents. She is a Member of the Editorial Board of some international journals. Her research interests include molecular self-assembly of amphiphilic copolymers, controlled/living radical polymerization, and macromolecular design using supercritical carbon dioxide.

eyoshida@ens.tut.ac.jp