

論文 / 著書情報
Article / Book Information

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Title(English)	Formation of Double Gyroid and Patchy Particle Nanostructures through the Self-Assembly of Diblock Copolymers
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Category(English)	Doctoral Thesis
種別(和文)	要約
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(博士課程)
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論文要約

THESIS OUTLINE

系・コース： Department of, Graduate major in	材料 材料	系 コース	申請学位 (専攻分野)： Academic Degree Requested	博士 Doctor of	(工学)
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論文題目 Thesis Title	Formation of Double Gyroid and Patchy Particle Nanostructures through the Self-Assembly of Diblock Copolymers
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This thesis titled “Formation of Double Gyroid and Patchy Particle Nanostructures through the Self-Assembly of Diblock Copolymers”, aims to formation next-generation materials containing highly ordered double gyroid and patchy particle nanostructures by self-assembly using diblock polymers.

The self-assembly of P2VP-*b*-PTFEMAs with different mass composition ratios by solution casting method result in lamellae, cylinders, and even rare double gyroid structures. The effects of the molecular weight and mass composition of the prepared P2VP-*b*-PTFEMAs on the formation of microphase-separated structures are investigated. Based on small-angle X-ray scattering, transmission electron microscope, SEM analysis, and the establishment of 3D modeling for comparison, it is found that the structural planes of the obtained 3D samples of P2VP₈₃-*b*-PTFEMA₄₆ films are corresponding to the typical (211), (110), and (111) planes of the *Ia3d* space symmetry group.

Next, P2VP-*b*-PTFEMAs are subjected to 3D confinement self-assembly method — self-organized precipitation (SORP) to form emulsified droplets, which finally precipitate to form particles. After annealing under evacuation, uniform concave pores are obtained on the surface with a morphology very similar to that of the golf ball surface structure. The effect of solvent on the formation of nanostructures in different self-assemblies is also elaborated.