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Single Gyroid Nanostructure from Templated Electroless Plating Using Double Gyroid-Structured Block Copolymer Template KAI-CHIEH YANG, CHENG-THAI YAO, RONG-MING HO, National Tsing Hua University — Here, we aim to suggest a novel approach for the fabrication of metallic materials with single gyroid (SG) texture using double gyroid (DG)-structured polymer template through the control of nucleation and growth mechanism. Nanoporous polystyrene (PS) with DG texture is prepared from the self-assembly of polystyrene-b-poly(L-lactide) (PS-PLLA) followed by hydrolysis of PLLA block, and then used as a template for templated electroless plating. With the introduction of Pd ion solution to the PS template, homogeneously distributed Pd within the PS template can be prepared by using hydrazine for the reduction of Pd ions, giving Pd nuclei for the growth of SG-structured Ni from the reduction of Ni ions. Subsequently, the Ni deposition using the Pd nuclei as catalytic site can be carried out to form SG-structured Ni. Nanoporous Ni with SG-structured texture can be obtained after removal of the PS template by washing with dichloromethane. With this novel approach, SG-structured Ni with controlled particle radius from hundreds nm to micrometer can be prepared by tuning the growth time for the Ni deposition.

Kai-Chieh Yang
National Tsing Hua University

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