

One-step synthesis of Palladium nanostructure for photo catalysis and SERS applications

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Here, we report for the first time a facile one-step fabrication route of non-spherical palladium (Pd) nano particles by polymer self-assembly. The present method was previously used to synthesize other metal and metal-oxide nanomaterials including Ag and Au [1-4]. In this project we aim to extend this synthesis way to Pd nanomaterials due to the potential of Pd in photocatalysis and the difficulty to produce anisotropic Pd nanoparticles by simple synthesis methods [5]. To make it possible, Pd precursor-loaded PMMA dispersion is spin coated on silicon substrate. Consequently, vapor induced phase separation induces the PMMA self-assembly into a nano-porous film including the Pd nano-particles inside its holes. Both shape and size control until obtaining non-spherical Pd morphology were carried out by adjusting Pd precursor's concentration and solvent, PMMA solvent and spin coating speed. As a result, moderate precursor concentration combined with moderate speed favor the formation of non-spherical morphology of Pd nano structures. Subsequently SERS (Surface enhanced Raman spectroscopy) performance of different morphology of synthesized palladium nano particles has been studied.

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