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## PATTERNING HYBRID THIN FILM NANOSTRUCTURES USING BLOCK CO-POLYMER TEMPLATE

**Dr Himadri Acharya**

Centre for Soft Matters, Department of Chemistry,  
Assam University, Silchar-788011, India  
[himadriau@yahoo.in](mailto:himadriau@yahoo.in)

### Abstract

Fabrication of ordered nanostructures in large area using diblock copolymer based self-assembly techniques are of great interest owing to their simple and low cost patterning method. Block copolymer nanoparticle hybrids are attractive for its potential applications in electronic, optoelectronic catalysis, sensors, and magnetic devices. Amphiphilic diblock copolymers with their varying number of blocks, chemical compositions and characteristic dimensions control the micro phase separation and morphology in thin deposited film on solid substrates. Selective incorporation of precursors/nanoparticles into one of the blocks of the self-assembled diblock copolymers is achieved either by complexation with hydrophilic blocks or by directly attaching the preformed nanoparticles with desired sizes. Here we describe a simple solution blending and subsequent spin coating methods for the facile synthesis of position controlled Ag, Au, TiO<sub>2</sub> nanoparticles selectively located in the microphase separated block copolymer. The inclusion of different nanoparticles in the block copolymer system both in bulk and films have been studied using the characterization tools of AFM, SEM, TEM, GISAXS and XPS analysis. The controlled deposition of nanoparticles in a copolymer film gives a broad tunability over the optical properties and high catalytic activity.

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