Fabrication of Baroplastic Block Copolymer/Gold Nanoparticle Composite and Investigation of Conductivity Depending on Pressure

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We prepared lamellar-forming polystyrene-b-poly(n-pentyl methacrylate) copolymer (PS-b-PnPMA)/gold nanoparticle composites. First, gold nanoparticles were decorated with 11-mercapto-1-undecanol having a favorable interaction with PnPMA block. PS-b-PnPMA has excellent "baroplasticity" that the ordered microdomains are easily transformed into disordered state even when a relatively low pressure is applied. Gold particles are first sequestered into the PnPMA lamellar microdomains. However, when a pressure was applied, the gold particles are well dispersed in the disordered PS and PnPMA phases. Depending on the dispersion of gold nanoparticles, the conductivity was greatly changed. This technique could be used for the fabrication of the nano-scaled circuit.