A facile method to prepare highly conductive polymer core/metal shell particles via polydopamine-assisted electroless plating

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Polymer core/metal shell composite particles having superior electrical conductivity were prepared by the electroless plating of metal (silver) on polystyrene (PS) particles. Monodisperse PS microspheres of 3 micrometer in size as seed particles were synthesized by dispersion polymerization technique. In this study, polydopamine (PDA) and glucose were used as reducing agents for metal ions. The core/shell composite particles were prepared by electroless plating of silver after the formation of PDA on the surface of PS particles through self-oxidative polymerization of dopamine. The morphology and electrical conductivity of PS core/silver shell composite particles were investigated to confirm the thickness uniformity of silver plating and the conductivity enhancement of composite particles. As a result, silver layer on PS seed sphere was successfully encapsulated. Compared with the conventional core/shell composite particles, it was confirmed that high electrical conductivity was achieved by PDA-assisted electroless plating.

Keywords: core-shell composite particle, electroless plating, monodisperse polystyrene particle, polydopamine, glucose