Preparation of highly conductive PMMA-reduced graphene oxide composite using latex technology

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Conductive polymer nanocomposites are receiving more and more attention, both from academic research groups as well as from industry because of their great promise in various applications, mainly in the field of functional polymer systems, such as anti-static coatings, EMI shielding materials. Graphene, a monolayer of sp^2-hybridized carbon atoms arranged in a two-dimensional lattice, has considered as ideal nanofiller due to its outstanding mechanical, thermal, electrical properties as well as large surface areas. In this study, we report a simple, environment-friendly approach for preparing highly conductive PMMA-reduced graphene oxide (PMMA-RGO) composite by self-assembly of positively charged PMMA latex particles and negatively charged graphene oxide sheets through electrostatic interaction, following by hydrazine reduction. The obtained PMMA-RGO exhibited excellent electrical properties with the percolation threshold as low as 0.16 vol% and an electrical conductivity of 64 S/m at only 2.7 vol%.