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Fabrication of a Flexible Electromagnetic Interference Shielding Fe₃O₄@Reduced Graphene Oxide/Natural Rubber Composite with Segregated Network

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Abstract

Flexible natural rubber/magnetic iron oxide (Fe₃O₄)@reduced graphene oxide (NRMG) composites with segregated structure were prepared by a self-assembly method in latex. Various characterization techniques were employed to verify the successful preparation of Fe₃O₄@rGO and the formation of segregated structure within the bulk composites. Compared with natural rubber/reduced graphene oxide (NRG) composites, the presence of Fe₃O₄ enhances the electromagnetic interference shielding effectiveness (EMI SE) of NRMG composites. The EMI SE value of NRMG composite with 10 phr (part per hundred parts of rubber) rGO is 1.4 times higher than that of NRG composite with the same rGO content in the frequency range of 8.2-12.4 GHz. The specific EMI SE of NRMG composite reaches 26.4 dB mm⁻¹, outperforming the ever-reported polymer/Fe₃O₄@rGO composites with low rGO content. Excitingly, the EMI SE of

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