

One-step synthesis of a highly conductive graphene-polypyrrole nanofiber composite

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Graphene-based nanocomposites have been widely studied for use in many applications including chemical sensing, energy storage and energy conversion. These composites have improved properties that are a result of synergetic and interactive effects between graphene and other nanostructures. In this study we report a reduced graphene oxide (RGO) and polypyrrole (PPY) nanofiber composite in one step redox reaction under UV illumination at room temperature. In this process, electrons generated during pyrrole polymerization under UV illumination convert GO to RGO without any reducing agents. The growth of PPY nanofibers and the reduction of GO were confirmed by SEM, XPS, Raman, XRD, and FT-IR. The electrical conductivities of the RGO-PPY nanofiber composites and RGO were 104 S m^{-1} and 600 S m^{-1} , respectively, which confirmed the reduction of GO and the formation of PPY. This composite showed improved gas sensitivity over RGO alone.