Title:	Reusable graphene oxide nanofibers for enhanced photocatalytic activity: a detailed mechanistic study
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Abstract:	Water pollution due to indiscriminate disposal of industrial dyes poses serious environmental hazards nationally and internationally. Some of the dyes are potentially carcinogenic and may induce mutagenicity and genotoxicity. Recently, graphene-based nanocomposite has attracted considerable interest for photocatalysis-based wastewater treatment. Here, we report the production of graphene-oxide-based hydrophobic PAN/GO nanofibers using electrospinning technique for photocatalytic degradation of Rhodamine 6G dye under natural sunlight illumination. The synthesized nanofibers were characterized using X-ray diffraction, EDX, field emission scanning electron microscopy and FTIR spectroscopy. Dye removal efficiency was investigated by monitoring UV–Vis absorption intensity over time. Structural change in dye was studied using FTIR analysis. Kinetics of dye degradation reaction was monitored through pseudo-first-order and pseudo-second-order kinetics model. Effects of nanofiber weight and initial dye concentration on the degradation efficiency were investigated in detail. Reusability and stability of these synthesized nanofibers in dye solution have been studied using scanning electron microscopy and FTIR spectroscopy. A comparative study for dye degradation was also performed using TiO2-coated nanofibers under visible light and UV light illumination. These large-area reusable graphene oxide nanofibers provide a scalable and novel route for photocatalytic degradation of carcinogenic dyes from industrial water.
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