Highly efficient dye-adsorption of surface-modified graphene aerogel

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A variety of organic dyes being used in wide industrial fields have been sources of water contamination, which are seriously toxic and carcinogenic to humans and environments. As alternative adsorbents to traditional porous adsorptive materials, carbon-based three-dimensional (3D) porous architectures such as carbon nanotube (CNT) sponges and graphene-based macrostructures (foam- and sponge-type 3D structures) have recently been explored to be a promising candidate for efficient pollutant adsorbents due to their high adsorption capacity, fast adsorbing kinetics, excellent selectivity and robust mechanical properties. In this research, we tailored the surface property of chemically reduced graphene oxide (rGO) aerogel for efficient removal of dyes (Acid red 1, Acid Yellow 23, and Methylene Blue) from their aqueous solutions. The significantly enhanced dye-adsorption capability was characterized to mainly result from the surface-tailoring of rGO aerogel, while maintaining the high specific surface area and the open porosity of 3D rGO scaffold.