

Synthesis of bismuth functionalized graphene oxide and application for removal of radioactive iodine

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We have successfully synthesized bismuth-functionalized graphene oxide (Bi-GO) and tested for radioactive iodine (iodide and iodate) removal efficiency from radioactive wastewater. Bismuth on the graphene oxide surface was characterized using SEM, XRD, FT-IR, and XPS analyses and confirmed the presence of iodine species on the Bi-GO surfaces. Dominant iodine surface species are BiOI and Bi(IO₃)₃(H₂O)₂ after iodide and iodate removal experiment, respectively. During the selectivity test using difference background solutions with varying concentrations, Bi-GO still showed higher removal efficiencies ($\geq 95\%$) for both iodide and iodate than the commercial silver-exchanged zeolite ($\geq 95\%$ for iodide and $\leq 25\%$ for iodate), which provides insights of a potential application for selective removal of both iodide and iodate contaminants from radioactive wastewater.