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Environmental estrogen Bisphenol A adsorption/oxidation on Graphene oxide/MnO_2 (GO/MnO_2) nanocomposite

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The environmental fate and decontamination of Bisphenol A (BPA), an environmental estrogen that is used as a monomer in plastic industry, are of emerging concern. This study focused on the kinetics, influencing factors and pathways of its adsorption and oxidative decomposition by MnO_2. Additionally, Graphene oxide/MnO_2 (GO/MnO_2) nanocomposite was prepared and tested as a kind of adsorbent and/or catalysts for oxidative decomposition of Bisphenol A (BPA). A suspension of graphene oxide/manganese sulfate (GO/MnSO4) produced by the modified Hummers method was in situ transformed into GO/MnO_2 nanocomposite in combination with KMnO4. It is found that MnO_2 nanoparticles are uniformly distributed in the structure of GO. The surface chemistry and the porous texture of the prepared nanocomposite were characterized by thermal analysis (DTA), Fourier Transform Infrared Spectroscopy (FTIR), Scanning Electron Microscope (SEM) and Nitrogen adsorption (BET). The nanocomposite presented superior catalytic activities, much higher than that of the bare MnO_2 for the decomposition of BPA in the presence of H_2O_2. The high activity of GO/MnO_2 nanocomposite for the decomposition of BPA could be related to the synergistic effect of GO and MnO_2 with the assistance of H_2O_2 according to the adsorption–oxidation–desorption mechanism.