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A novel magnesium ascorbyl phosphate graphene-based monolith and its superior adsorption capability for bisphenol A

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Abstract

In this study, a non-shell graphene-based monolith (GBM) with huge surface area was synthesized by chemical reduction of Graphene oxide (GO) using magnesium ascorbyl phosphate (MAP), and tested as an adsorbent for trace Bisphenol A (BPA) removal. The properties of MAP-GBM was characterized by scanning electron microscopy (SEM), Brunauer-Emmett-Teller N_2 specific surface area (BET), X-ray powder diffraction, Fourier transform-infrared (FTIR), Raman, and X-ray photoelectron spectroscopies. BPA adsorption was investigated in batch and column adsorption experiments. The data showed that MAP-GBM was a three-dimensional (3D) graphene material with macrostructure and most C=C double bonds were recovered. Adsorption isotherms and kinetics of BPA on MAP-GBM followed the Langmuir model and fitted well with a pseudo-second-order kinetic model, respectively, and the adsorption process was endothermic. The saturated adsorption capacity of MAP-GBM was 324 mg/g for BPA, which was 2.43 times of that of ascorbic acid-GBM. A MAP-GBM adsorption column completely removed BPA from solution at low concentration