Title:	Ni-Fe-layered double hydroxide/N-doped graphene oxide nanocomposite for the highly efficient removal of Pb(II) and Cd(II) ions from water
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Abstract:	Heavy metal removal from industrial wastewater has remained a tremendous challenge as the water pollution caused by them is posing a serious ecological threat. Several nanostructured materials have been developed for effective scavenging of water-borne metal ions, including high surface area metal oxides, mesoporous silica and carbon based materials. The oxide mediated interaction between the metal ions and the adsorbent leads to efficient loading of these toxic metal ions. Therefore, in order to design a highly efficient adsorbent for trapping toxic lead and cadmium ions from wastewater, a nanocomposite of Ni-Fe layered double hydroxide with N-doped graphene oxide have been synthesized via co-precipitation technique at ambient conditions and its metal adsorption characteristics have been further investigated under varying conditions such as pH, concentration, adsorbent loading and the time of contact. This novel nanocomposite has been found to exhibit Langmuir type adsorption of the metal ions indicating chemical nature of their adsorption on the surface of the nanocomposite and significantly higher adsorption efficiency as compared to the individual constituents. The adsorption process was found to follow a pseudo second-order rate equation with a rate constant of 0.025 g mg−1min−1. The nanocomposite was found to have a very high loading capacity of ~1000 mg/g for both lead and cadmium ions respectively. It also works well over a wide pH range (5–11) and the adsorbent can be easily regenerated after use. Thus, this material holds strong potential for applications in the treatment of heavy metal intoxicated industrial wastewater.
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