Facile synthesis of high-efficiency magnetic graphitic carbon nitride adsorbents for selective removal of hazardous anionic dyes in wastewater

Anwen Li, Yongyao Qiao, Xu Jiang, Min Zhao*, Longshan Zhao*

School of Pharmacy, Shenyang Pharmaceutical University, 103 Wenhua Road Shenhe District, Shenyang, Liaoning 110016, P. R. China.

*Corresponding author: Professor Longshan Zhao, Associate Professor Min Zhao, School of Pharmacy, Shenyang Pharmaceutical University, 103 Wenhua Road Shenhe District, 110016, Shenyang, Liaoning Province, P. R. China.

E-mail: longshanzhao@163.com; zm19871224@sina.com

Tel. /Fax: 86-2443520571
Chemical reagents

All solutions were prepared with ultrapure water. g-C₃N₄ was purchased from Beike Nano (Suzhou, China). Branched polyethyleneimine (PEI, MW: 600, content: 99%) was supplied by the Macklin Chemical Reagents Co., Ltd (Shanghai, China). Congo red was purchased from Damao Chemical Reagent Co., Ltd (Tianjin, China). Other materials used were analytical grade in this study.

Characterization

Fourier transform infrared spectroscopy (FT-IR) was recorded on a Nicolet iS50 Fourier transform infrared spectrophotometer (Thermo Scientific Co., USA) in the range of 400–4000 cm⁻¹. Scanning electron microscopy (SEM) was used to characterize the microstructure of the sample using a FEI Nova Nano SEM 450 (JEOL Co., Japan) and Transmission Electron Microscope (TEM) was obtained on a JEM-2100F electron microscope (JEOL Co., Japan). Vibrating sample magnetometer (VSM) analysis of the synthesized materials was carried out with Lake Shore 7407 (Lake Shore, USA) at room temperature. X-ray Photo Spectroscopy (XPS) analysis was carried out by using a Thermo Fisher ESCALAB 250Xi (Thermo Scientific Co., USA) to confirm the chemical compositions. X-ray Diffraction (XRD) measurements over 20 range from 20 to 70° were carried out at room temperature by using a D8 Advance X-ray diffractometer (Bruker, Germany). The surface area and the pore size of the samples were obtained with N₂ adsorption/desorption isotherms at 77.3K using the ASAP2460 analyzer instrument (Micromeritics Instrument Corp, USA).
Fig. S1. (a) N$_2$ adsorption/desorption isotherm (b) BJH pore size distribution
Fig.S2. The effect of adsorption dosage..