

Supporting Information (SI) on

Performance and mechanism of U(VI) removal from solution by the humic acid-coated Fe₃O₄ nanoparticles modified biochar from filamentous green algae

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Materials

The filamentous green algae have been collected from the lake of Shaoxing, Zhejiang Province, China. FeCl₂·6H₂O, FeCl₃·6H₂O, Arsenazo III, UO₂(NO₃)₂·6H₂O, NaOH, H₂SO₄, hydrochloric acid, ethyl alcohol, acetic Acid and 4-Hydroxybenzaldehyde were obtained from Merck Chemical Co. The above chemical agents were analytical purity and used without further purification. The solution of U(VI) ion was obtained from the powder of UO₂(NO₃)₂·6H₂O after dilution with anaerobic deionized water. The anaerobic deionized water was prepared by aerating N₂ into Milli-Q water for 25

min. All experiments were carried out with the anaerobic deionized water.

Preparation of Biochar

The filamentous green algae have been collected from the lake of Shaoxing, Zhejiang Province, China. Then, they were cleaned using deionized water, and dried at room temperature. The dried filamentous green algae were pulverized and sieved to 50 meshes. The generated filamentous green algae were calcinated at 450 °C for 2 h in a tube furnace with a heating rate of 10 °C/min⁻¹ and supplied nitrogen flow of 100 mL/min⁻¹. Finally, biochar from filamentous green algae was obtained.

Characterization and Experiments

The micro-morphology features of adsorbent materials were determined by technologies of SEM (Scanning Electron Microscopy, Hitachi S-4800, Japan) and TEM (Transmission electron Microscopy, FET Tecnai S-TWIN, USA). The elemental mappings of samples were analyzed by technology of EDS (Energy Dispersive Spectroscopy, JEOL JEMARF200F, Japan). The microscopic crystalline structures of samples were obtained by technology of XRD (X-ray diffraction, Rigaku Ultima IV). The functional groups on the surface of samples were determined by technology of FTIR (Fourier Transform Infrared Spectrometer, Thermo Nicolet, Madison). XPS (X-ray photoelectron spectrometer, Krato AXIS Ultra DLD, Japan) and the model Axis-HS (Kratos Analytical) were used.