Electronic supplementary information (ESI) for

Humic acid as promising organic anodes for lithium/sodium ion batteries

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Contents:

1. Experimental Details:

Materials and Characterization: Humic acid was purchased from Alfa Aesar Company and used without further treatment. Scanning electron microscopy (SEM) images were taken using Philips XL 30 and a JEOL JSM-6700F microscope. Transmission electron microscopy (TEM) images were taken on a FEI Tecnai G2 F20 transmission electron microscope with an acceleration voltage of 200 kV. Fourier transform infrared spectroscopy (FTIR) measurement for HA was performed on a Bruker Tensor 27 Spectrometer using KBr pellets. The X-ray photoelectron spectrum (XPS) sweep was recorded on the ESCALAB 250 (Thermo Electron) in which the excitation of X-ray was provided by a monochromatic source of Al Kα (1486.6 eV). Survey scans were obtained using a pass energy of 100 eV while high resolution scans of specific elements were obtained using a 20 eV pass energy.

Electrochemistry Investigation: For the working electrode preparation, HA was homogeneously mixed with Super P carbon and the binder-PTFE at a mass ratio of 85:10:5 (the total mass: 9mg). Then the obtained slurry was casted on a piece of Cu foil and dried in vacuum at 70^{o}C for 24 h. The coin cells CR2032 were assembled in an argon-filled glove box, in which HA, metallic lithium or metallic sodium foils, glassy fiber were used as working electrodes, countering electrodes and separators, respectively. The electrolytes for LIBs were 1 M LiPF6 in EC+EMC+DMC (1:1:1 volume ratio). The electrolytes for SIBs were 1 M NaPF6+PC+DMC (1:1 volume ratio). The CV curves were recorded using an electrochemical analyzer (Autolab Potentiostat, PGSTAT302N) and the discharge and charge measurements were carried out on a Land BT2000 battery test system (Wuhan, China).

2.

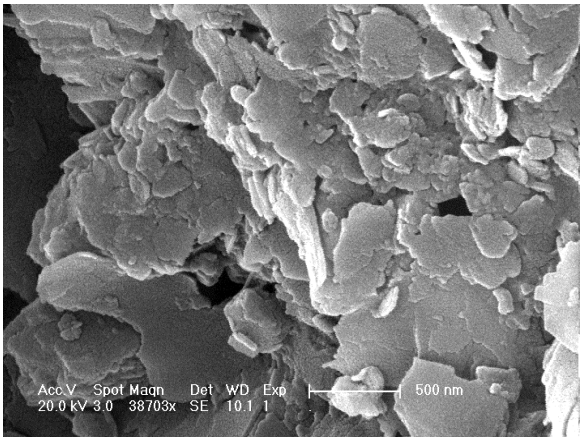

Fig. S-1 SEM image of HA.

3.

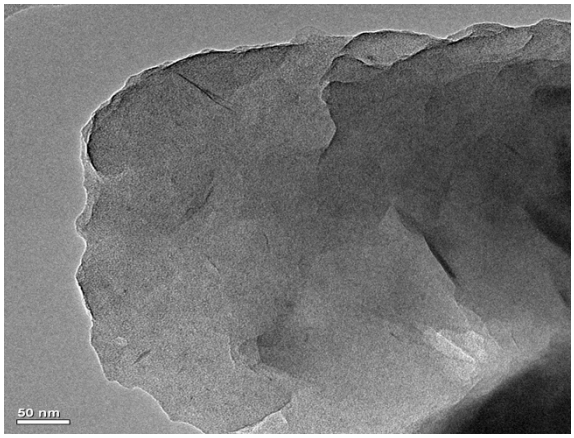

Fig. S-2 TEM image of HA.

4.

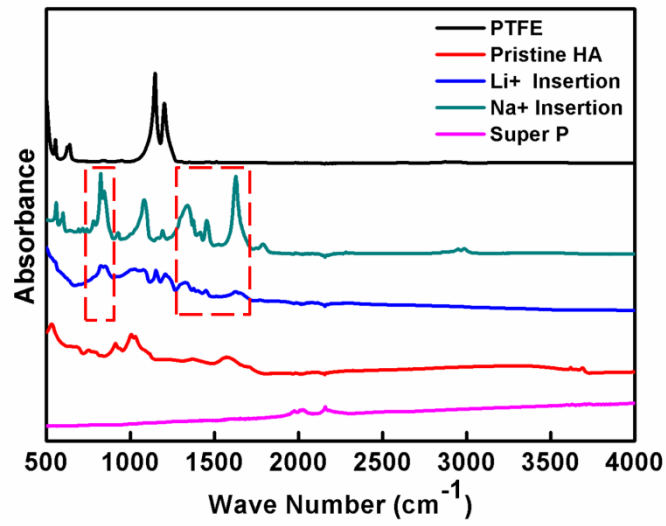

Fig. S-3 FTIR spectrum of the charged HA samples.