

Electronic Supplementary Material

Experimental section

VS₄@GAs Preparation: A graphene oxide aqueous solution (≈ 3 mg/mL) was prepared by using the modified Hummer's method. For the fabrication of 3D VS₄@GAs architectures: 0.36 g of NaVO₄ bulk, 0.12 g of TAA, 15 mL of GO solution, and 45 mL of H₂O were mixed together and stirred for 30 min. Then, the mixture was transferred to an 80 mL Teflon autoclave and treated at 160°C for 12 h. After natural cooling to the room temperature, the as-prepared VS₄@GAs was washed with deionized water and absolute ethanol for several times separately. Subsequently, the VS₄@GAs obtained was freeze-dried for 72 h to remove the residual water.

The lithium storage performance of the VS₄@GAs was tested on 2032 coin cells in an Ar-filled glove box using lithium foil as both counter electrode and reference electrode. The working electrodes were prepared by making slurry VS₄@GAs and PVDF in a weight ratio of 9:1 in NMP solution. The slurry was spread on the Al foil and dried at 120°C in vacuum for 12 h. The electrolyte was 1 M LiPF₆ in a 1:1:1 v/v mixture of diethyl carbonate, ethylene carbonate and ethylmethyl carbonate. Two pieces of Celgard 2400 were used as separators. The galvanostatic charge/discharge measurements were conducted on Neware from Shenzhen Neware Electronic Co., China, in a potential range of 1.5–3.0 V. Cyclic voltammetry (CV) were performed by CHI 650d electrochemical workstation at a scan rate of 0.1 mV/s.

FE-SEM (Hitachi, Tokyo, Japan) and TEM (Tecnai G2F30, FEI, US) were used to observe the typical morphology and microstructure of the VS₄@GAs composite. The X-ray diffraction patterns were obtained by using PANalytical (X'pert PRO). And X-ray photoelectron spectroscopy was conducted with Fisher Scientific Ltd, Nepean, ON. The nitrogen adsorption-desorption isotherm were measured by using ASAP 2020. The thermogravimetry analyses were carried out in air with 5°C/min from 10 to 700°C.

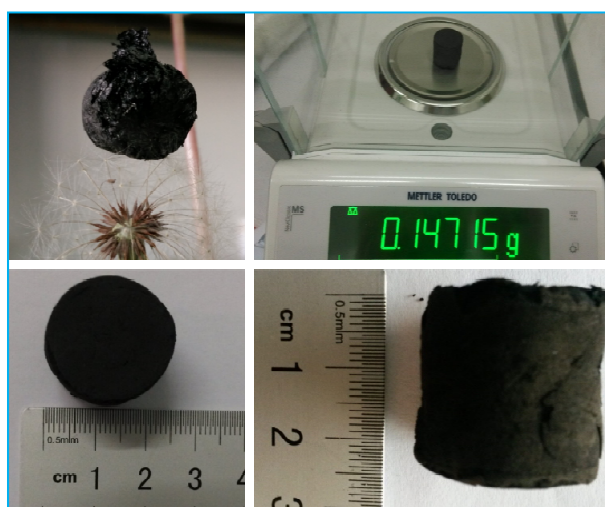


Fig. S1 Photo of VS₄@GAs

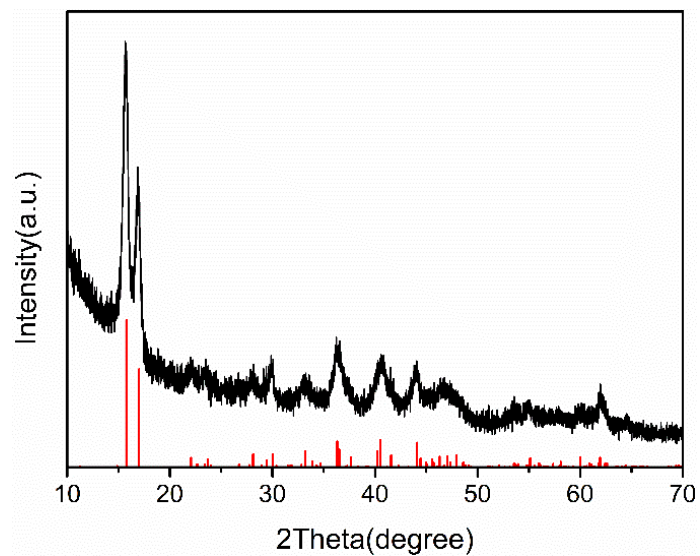


Fig. S2 X-ray diffraction pattern for VS₄@GAs

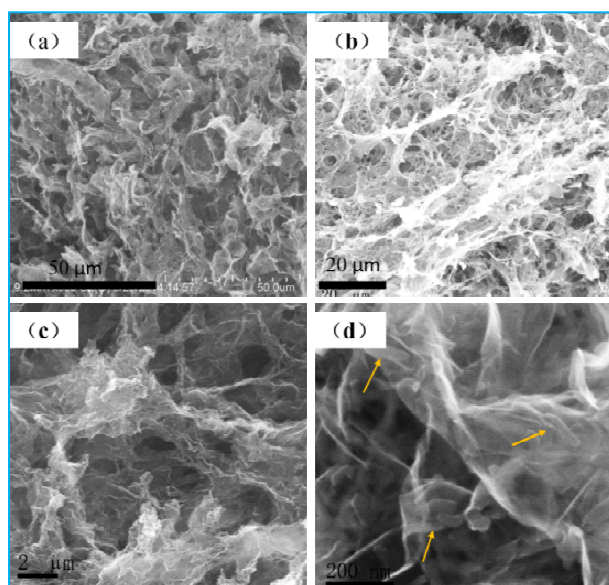


Fig. S3 FESEM images of VS₄@GAs with different magnification

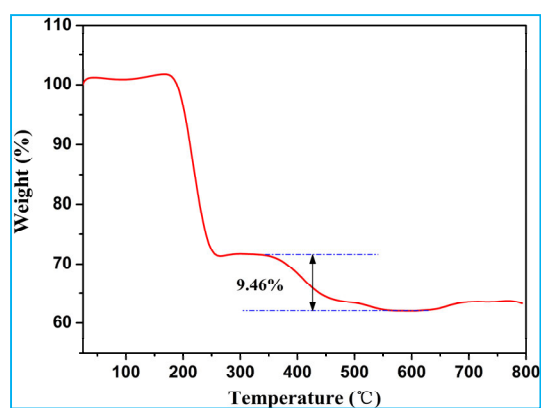


Fig. S4 Thermogravimetric curve of VS₄@GAs

