## Electronic Supplementary Information

## Poplar flower-like nitrogen-doped carbon tube @ VS<sub>4</sub> composites with excellent sodium storage performance

Fei Yang<sup>a</sup>, Wen Zhong<sup>a</sup>, Manman Ren<sup>a,b\*</sup>, Weiliang Liu<sup>a</sup>, Mei Li<sup>a</sup>, Guangda Li<sup>a</sup>, Liwei Su<sup>c</sup>

a School of Materials Science and Engineering, Qilu University of Technology (ShandongAcademy of Sciences), Jinan 250353, PR China

b Key Laboratory of Advanced Energy Materials Chemistry (Ministry of Education), College of Chemistry, Nankai University, Tianjin 300071, China

c State Key Laboratory Breeding Base of Green Chemistry-Synthesis Technology, College of Chemical Engineering, Zhejiang University of Technology, Hangzhou 310014, PR China

\* Email: renmanman@qlu.edu.cn

**Supplementary Figures** 

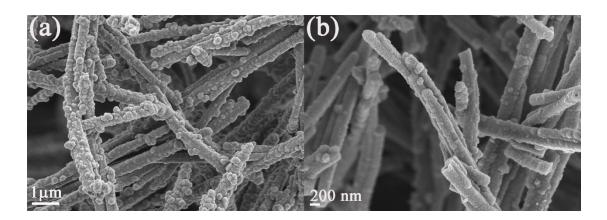


Fig. S1. SEM images of the NCNt.

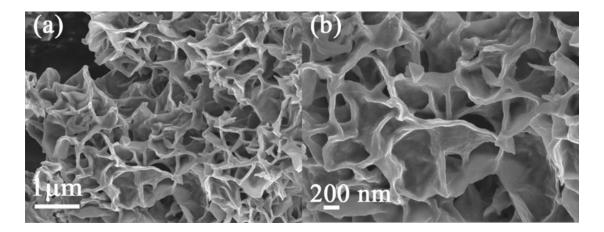


Fig. S2 SEM images of the pure VS<sub>4</sub> sample.

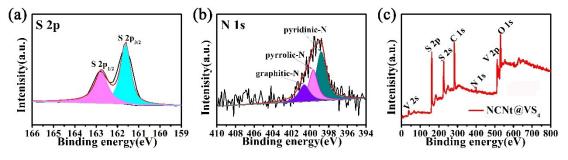


Fig. S3 (a) S 2p, (b) N 1s XPS spectra and (c) Survey XPS spectra of the NCNt@VS<sub>4</sub> sample.

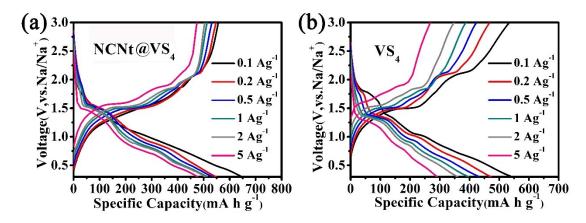


Fig. S4 Charge/discharge profiles of (a) the NCNt@VS<sub>4</sub> and (b) VS<sub>4</sub> electrode at different current densities.

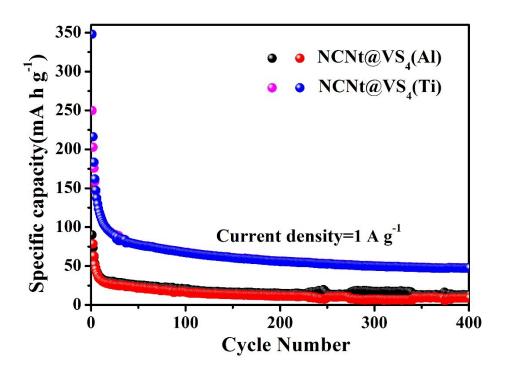


Fig. S5 The sodium storage performance of the nitrogen-doped carbon nanotube@VS<sub>4</sub> composite using Al and Ti foil as current collectors.

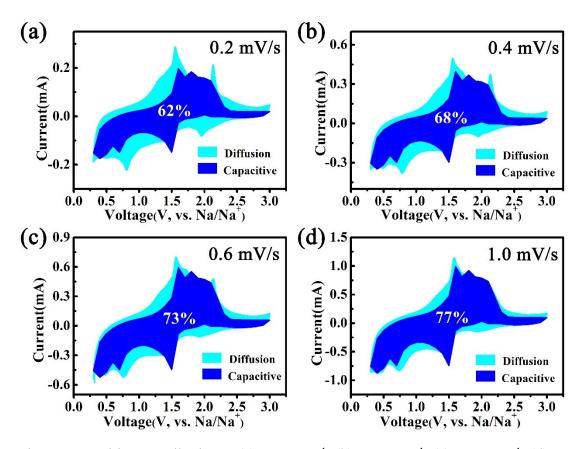


Fig. S6 Capacitive contribution at (a)  $0.2 \text{ mV s}^{-1}$ ; (b)  $0.4 \text{ mV s}^{-1}$ ; (c)  $0.6 \text{ mV s}^{-1}$ ; (d)  $1.0 \text{ mV s}^{-1}$  for NCNt@VS<sub>4</sub> electrode.