

A hybrid material of vanadium nitride and nitrogen-doped graphene for lithium storage

Kejun Zhang^{a+}, Haibo Wang^{a+}, Xiaoqing He^{b,+}, Zhihong Liu^a, Li Wang^{a, c}, Lin Gu^{b, *}, Hongxia Xu^a, Pengxian Han^a, Shanmu Dong^a, Chuanjian Zhang^a, Jianhua Yao^a, Guanglei Cui^{a, *}

^a Qingdao Institute of Bioenergy and Bioprocess Technology, Chinese Academy of Sciences, Qingdao 266101, P.R. China

^b Beijing National Laboratory for Condensed Matter Physics, Institute of Physics, Chinese Academy of Sciences, Beijing 100080, China.

^c Ocean University of China, Qingdao 266003, P.R.China

⁺ These authors contributed to the work equally.

* Corresponding author. Tel.: +86 532 80662746; fax: +86 532 80662744.

E-mail address: cuiGL@qibebt.ac.cn (G.L. Cui), l.gu@iphy.ac.cn (L. Gu).

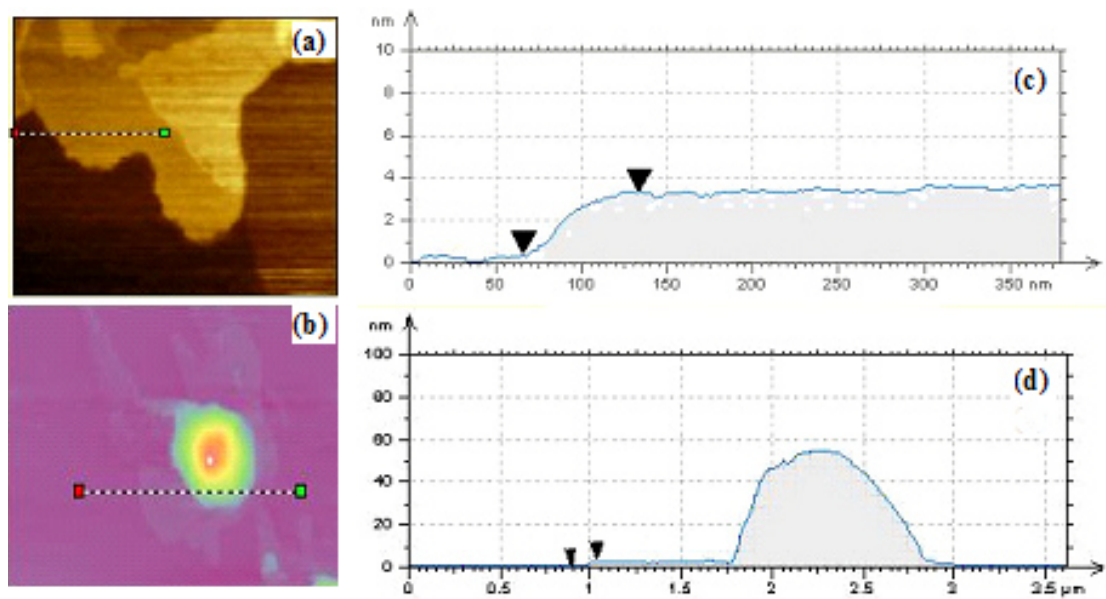
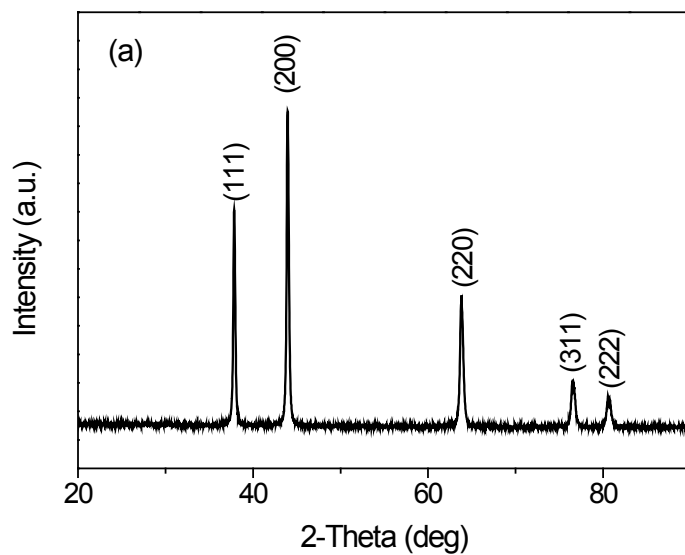


Fig. S1 Tapping-mode AFM images and corresponding height profiles of G derived from (a) and (c) VN-G-30% after a long time of sonication, (b) and (d) VN-G-30% after a short time of sonication. The thickness of the G is around 3.2 nm.



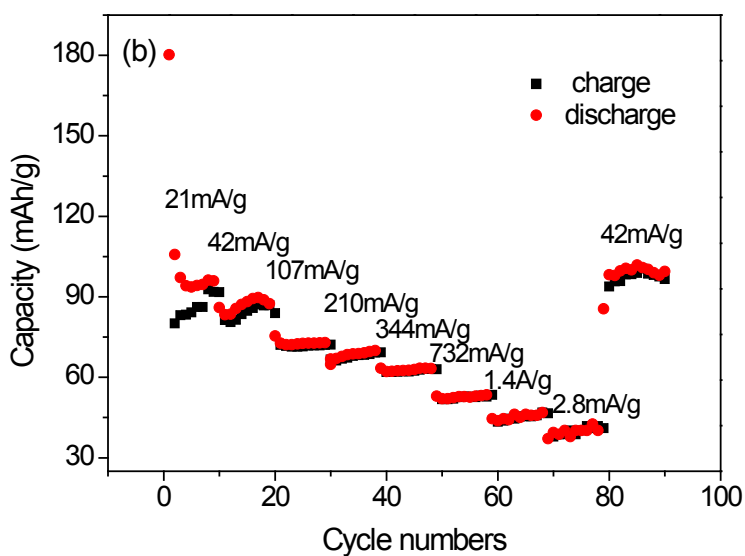


Fig. S2 XRD pattern and rate performance of of bulk VN prepared from commercial V_2O_5 cycled in EC/DMC solution containing 1 M $LiPF_6$

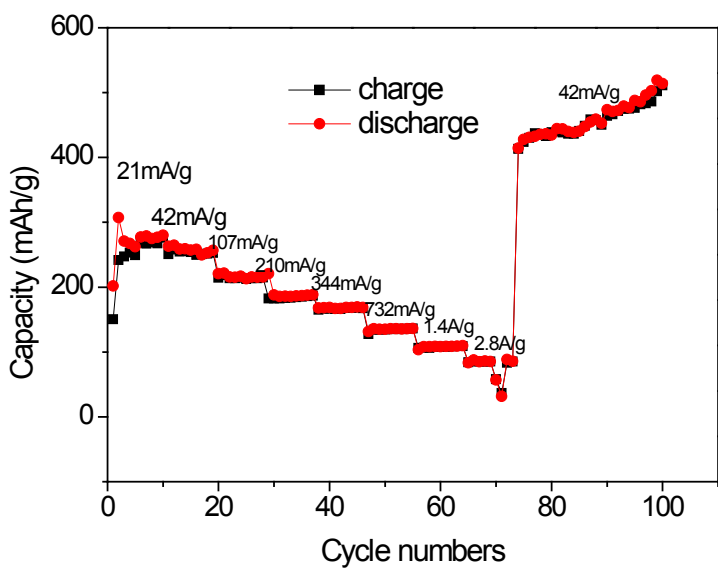


Fig. S3 Cycling and rate performance of VN-G-30% hybrid electrode cycled in EC/DMC solution containing 1 M $LiPF_6$.

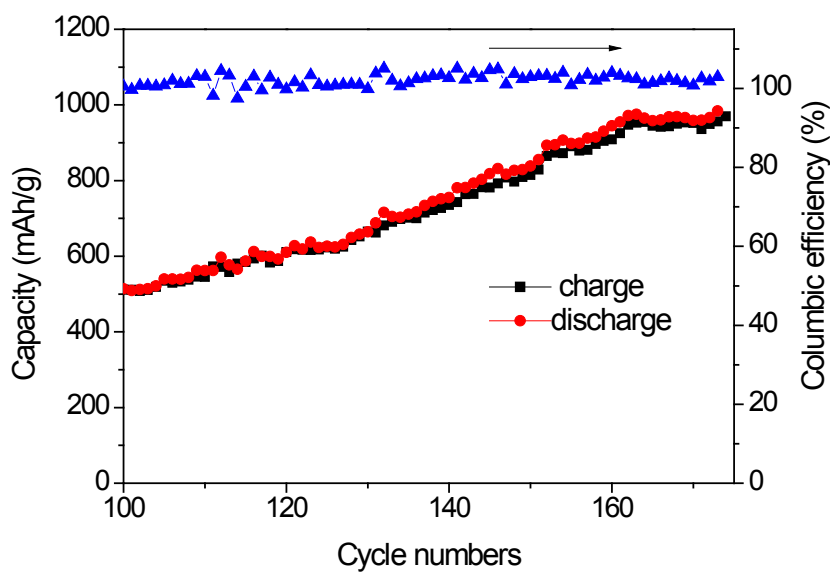


Fig. S4 Cyclic performance and coulombic efficiency of the VN-G-30% hybrid electrode cycled in EC/DMC solution containing 1 M LiPF₆ after rate performance.

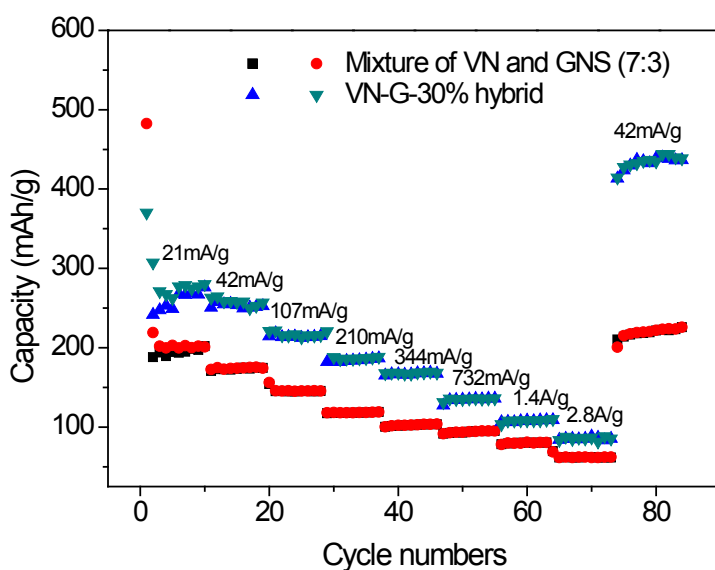


Fig. S5 Rate performances of VN-G-30% hybrid material, and a simple mixture of VN and G (7:3) electrodes cycled in EC/DMC solution containing 1 M LiPF₆.