



## Supporting Information

for *Small*, DOI: 10.1002/smll.201603973

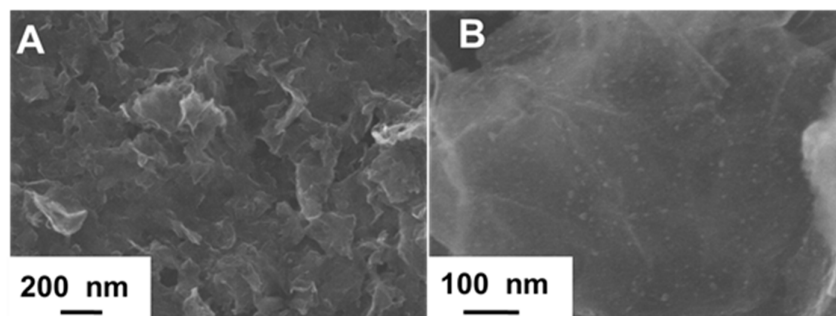
Phosphorus Enhanced Intermolecular Interactions of SnO<sub>2</sub> and Graphene as an Ultrastable Lithium Battery Anode

*Lei Zhang, Kangning Zhao, Ruohan Yu, Mengyu Yan, Wangwang Xu, Yifan Dong, Wenhao Ren, Xu Xu,\* Chunjuan Tang, and Liqiang Mai\**

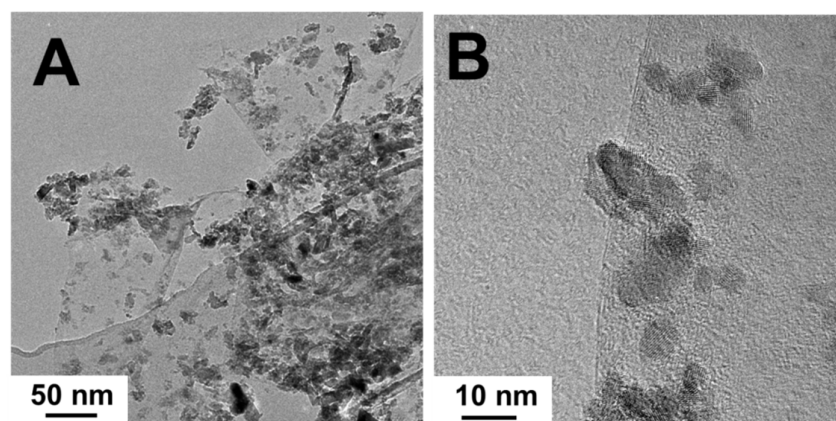
## Supporting Information

**Phosphorous enhanced Intermolecular Interactions of SnO<sub>2</sub> and Graphene as an Ultrastable Lithium Battery Anode**

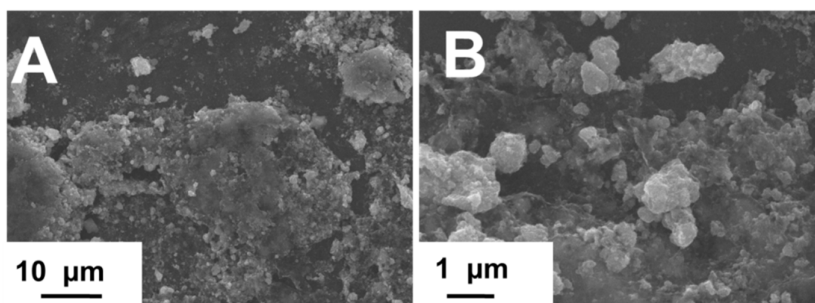
*Lei Zhang<sup>†</sup>, Kangning Zhao<sup>†</sup>, Ruohan Yu<sup>†</sup>, Mengyu Yan, Wangwang Xu, Yifan Dong, Wenhao Ren, Xu Xu\*, Chunjuan Tang, and Liqiang Mai\**



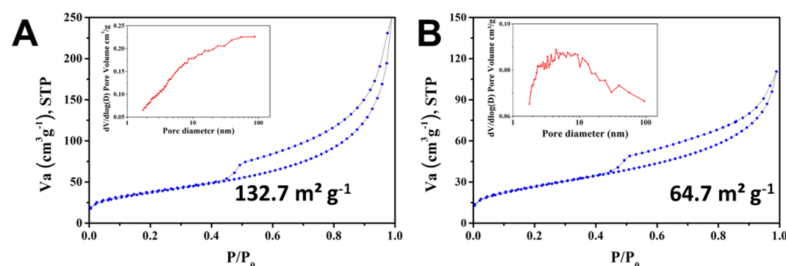
**Figure S1.** SEM images of SnO<sub>2</sub>@P@GO.



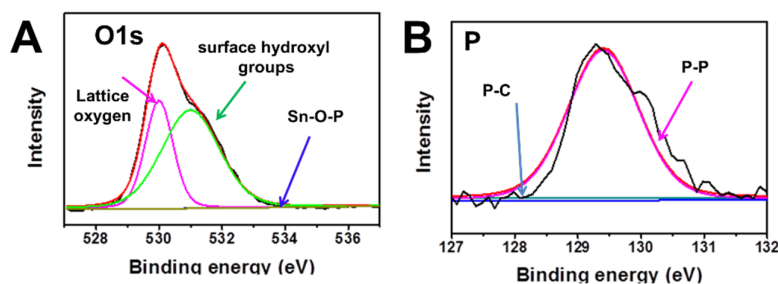
**Figure S2.** TEM images of SnO<sub>2</sub>/GO



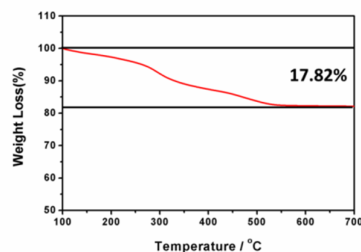
**Figure S3.** SEM images of SnO<sub>2</sub>/P/GO



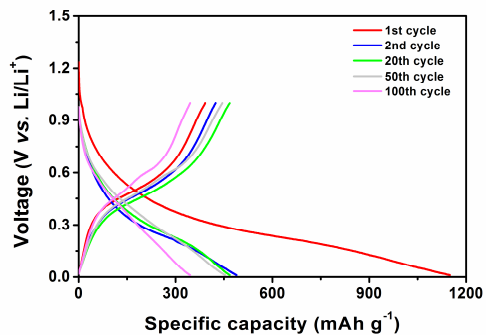
**Figure S4.** Nitrogen adsorption-desorption isotherms and pore size distributions (inset) of A) SnO<sub>2</sub>@P@GO and B) SnO<sub>2</sub>/P/GO.



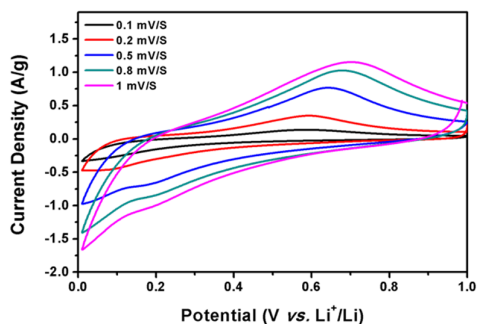
**Figure S5.** XPS spectrum of SnO<sub>2</sub>/P/GO: A) O1s spectrum, B) P1p spectrum.



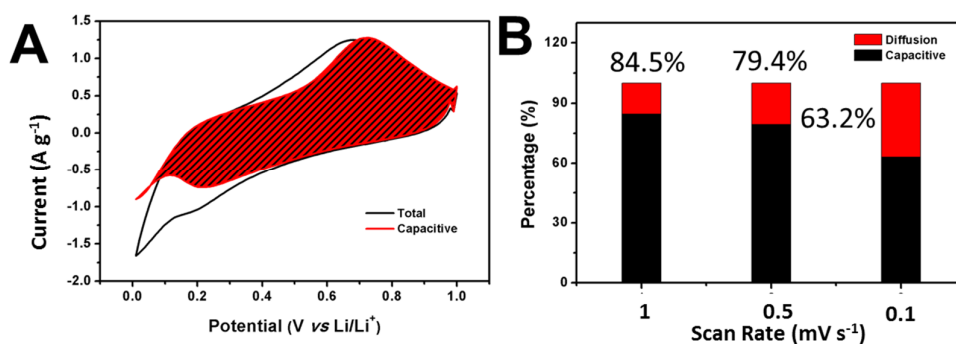
**Figure S6.** TG curves of SnO<sub>2</sub>@P@GO in air.



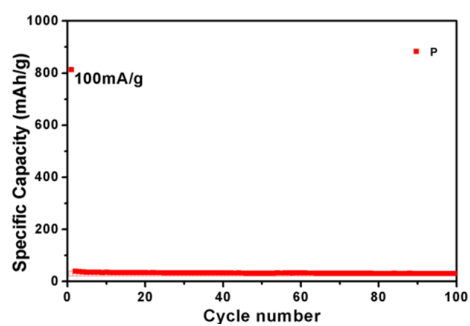
**Figure S7.** Charge-discharge curves of  $\text{SnO}_2/\text{P}/\text{GO}$  at  $100 \text{ mA g}^{-1}$ .



**Figure S8.** CV curves of  $\text{SnO}_2@\text{P}@\text{GO}$  at different scan rate ranging from 0.1 to  $1 \text{ mV s}^{-1}$ .



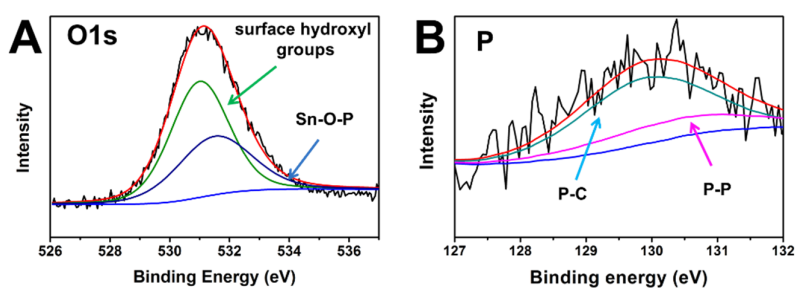
**Figure S9.** Kinetic analysis of  $\text{SnO}_2@\text{P}@\text{GO}$ : A) Separation of the capacitive and diffusion currents at a scan rate of  $1 \text{ mV s}^{-1}$ . B) Contribution ratio of the capacitive and diffusion-controlled charge at various scan rates.



**Figure S10.** Cycling performance of bare P at 100 mA g<sup>-1</sup>.

**Table S1** ICP result

Mass Ratio	
Sn	5.4
P	1



**Figure S11.** *Ex-situ* chemical composition analysis by XPS for A) O and B) P.