

Supporting Information

An amorphous Zn-P/graphite composite with chemical bonding for ultra-reversible lithium storage

Wenwu Li,^{*,a,c} Jiale Yu,^a Jiajun Wen,^a Jun, Liao,^a Ziyao Ye,^a Bote Zhao,^c Xinwei Li,^{*,d} Haiyan Zhang, Meilin Liu^c and Zaiping Guo^{*,b}

^aSchool of Materials and Energy, Guangdong University of Technology, Guangzhou 510006, PR China,

^bInstitute for Superconducting and Electronic Materials, School of Mechanical, Materials and Mechatronics Engineering, University of Wollongong, North Wollongong, NSW 2500, Australia.

^cSchool of Materials Science & Engineering, Georgia Institute of Technology, Atlanta, GA 30332, USA

^dDepartment of Mechanical and Energy Engineering, Southern University of Science and Technology, Shenzhen 518071, PR China.

*Corresponding author E-mail: wenwuligatech@gmail.com; lixw@sustc.edu.cn; zguo@uow.edu.au

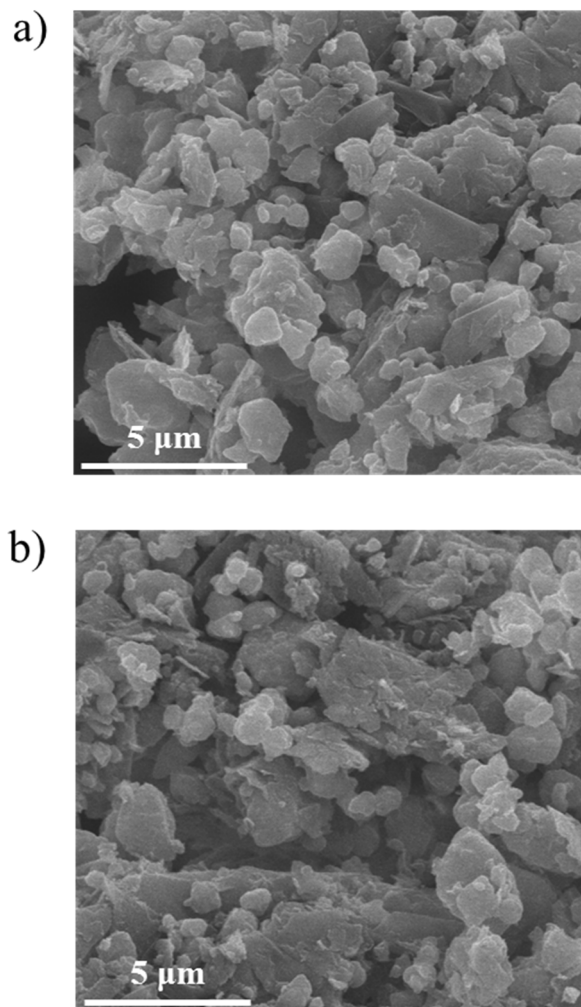


Figure S1. a), b) FESEM images of the ZnP_2 and Zn_3P_2 powders, respectively.

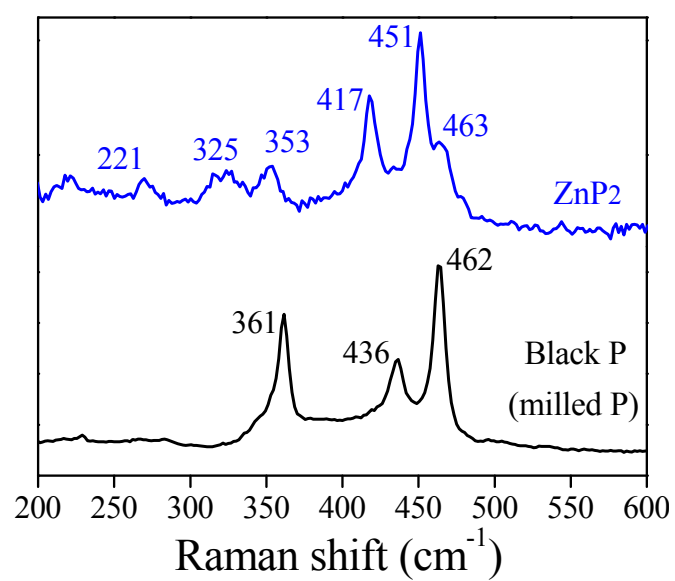


Figure S2. The Raman fingerprint peaks of the $\alpha\text{-ZnP}_2$ differing from the milled P counterparts.

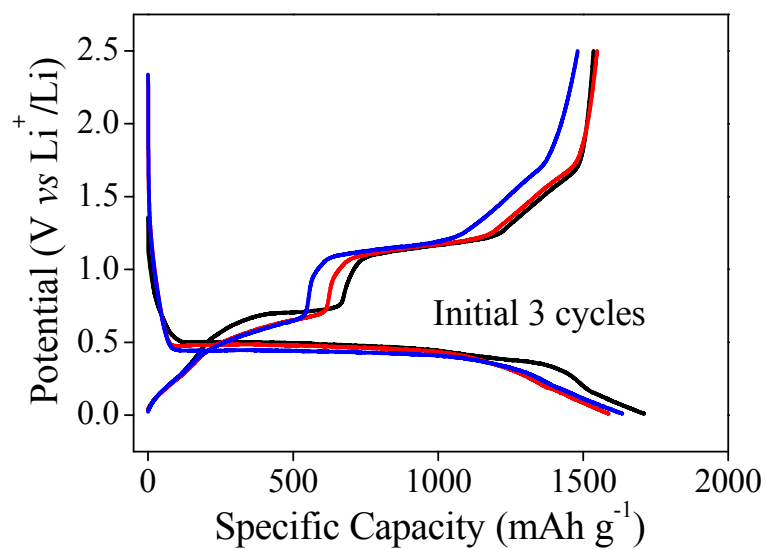


Figure S3. The initial three discharge/charge profiles of Zn_3P_2 .

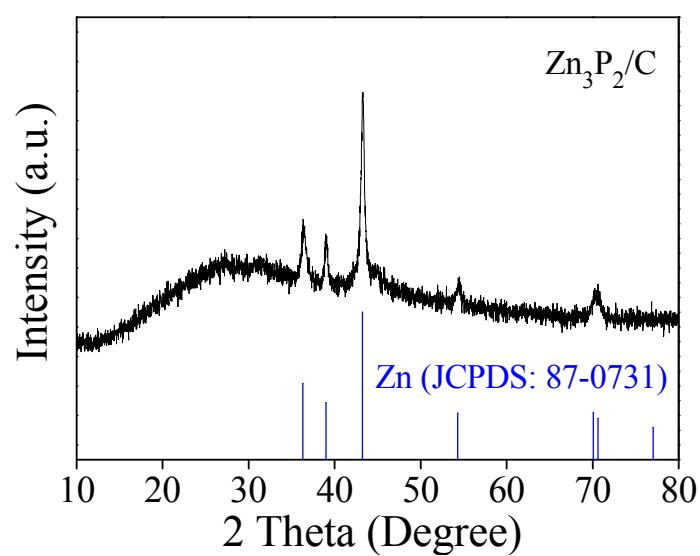


Figure S4. The XRD pattern of $\text{Zn}_3\text{P}_2/\text{C}$ (10 h) milled which degraded into a mixture containing crystalline Zn.

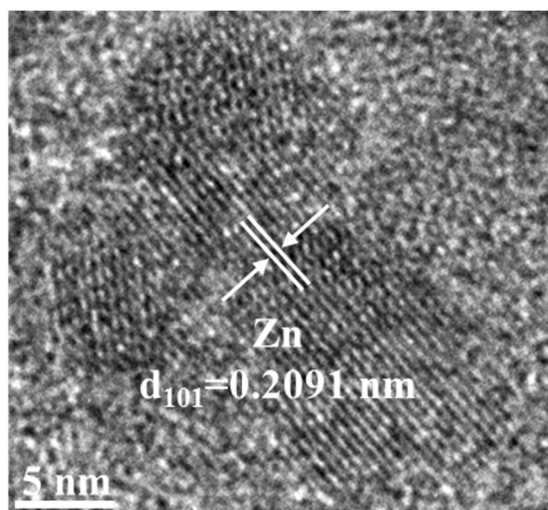


Figure S5. The crystalline Zn within the 3Zn-2P/C composite.

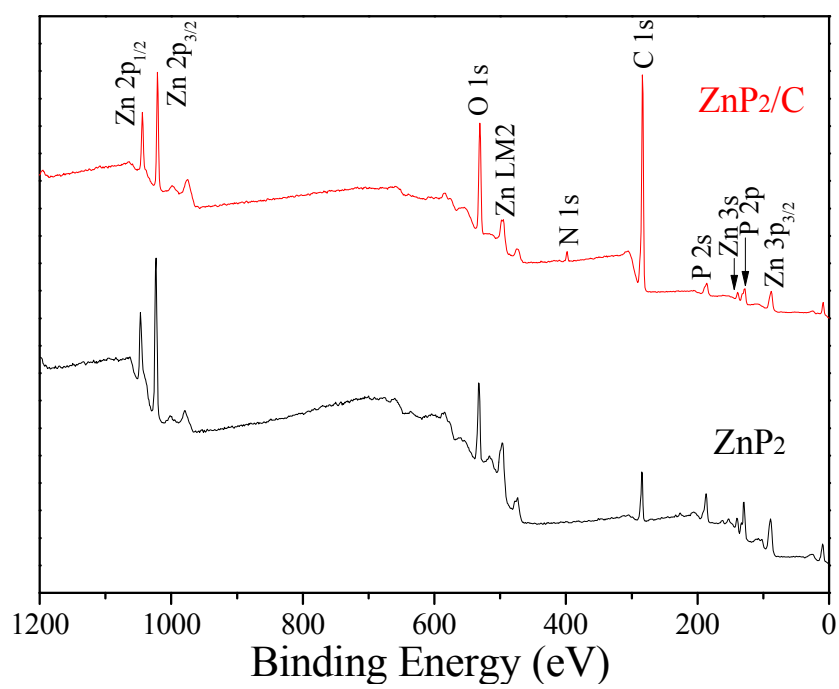


Figure S6. The XPS spectra of survey spectrum for ZnP₂ and ZnP₂/C.

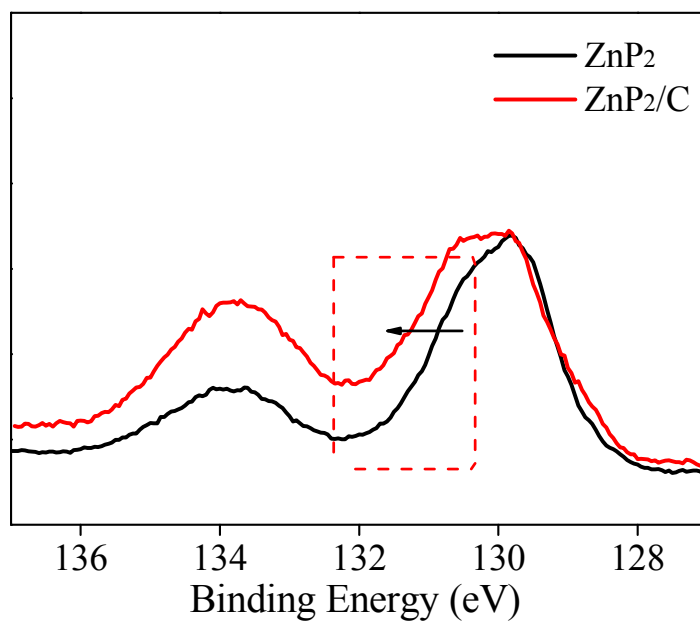


Figure S7. The XPS spectra of P 2p for ZnP₂ and ZnP₂/C.

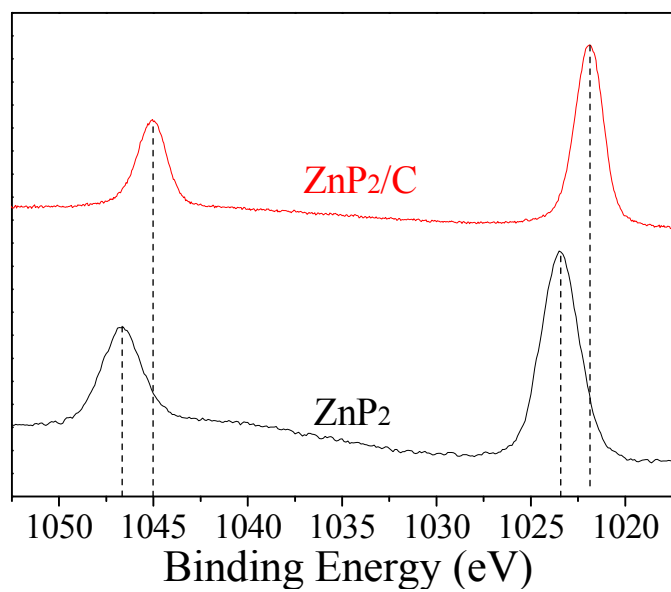


Figure S8. The XPS spectra of Zn 2p for ZnP₂ and ZnP₂/C.

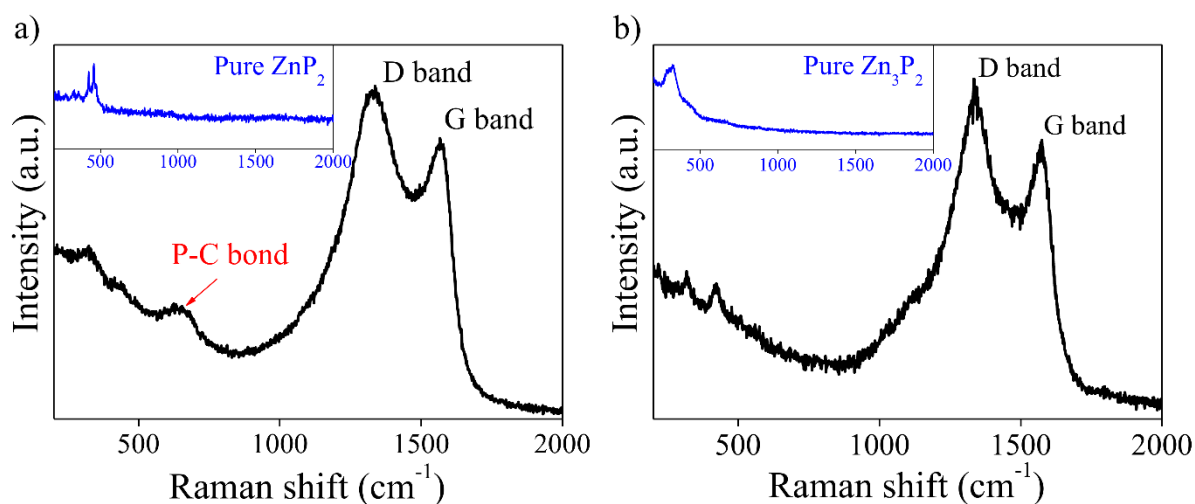


Figure S9. The Raman Spectra: a) ZnP_2 and its carbon composite; b) Zn_3P_2 and its carbon composite

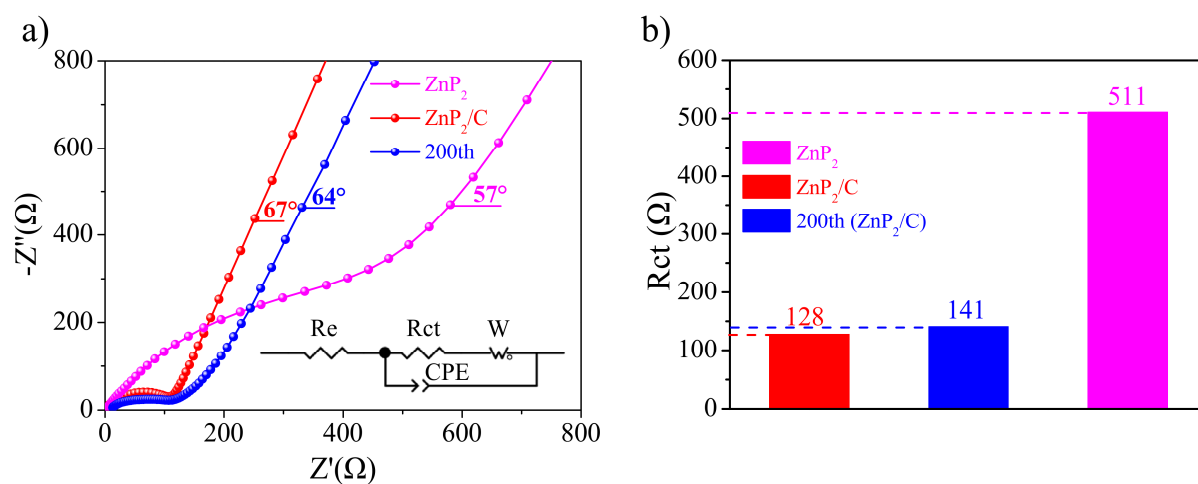


Figure S10. The electrochemical impedance spectra of the pristine ZnP_2 electrode (pink), the pristine ZnP_2/C electrode (red), the ZnP_2/C electrode (blue) after 200 cycles.

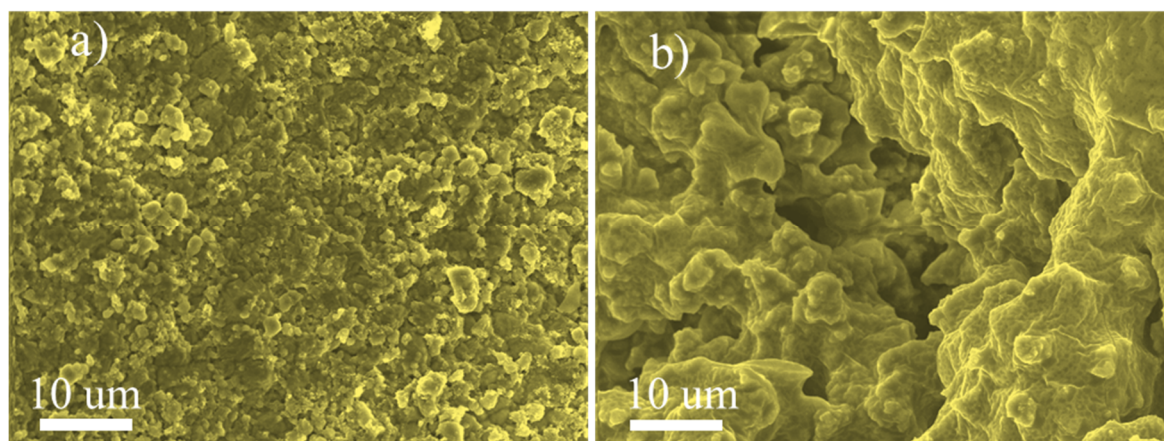


Figure S11. The electrode morphology after 50 cycles: a) the ZnP_2/C electrode; b) the ZnP_2 electrode.

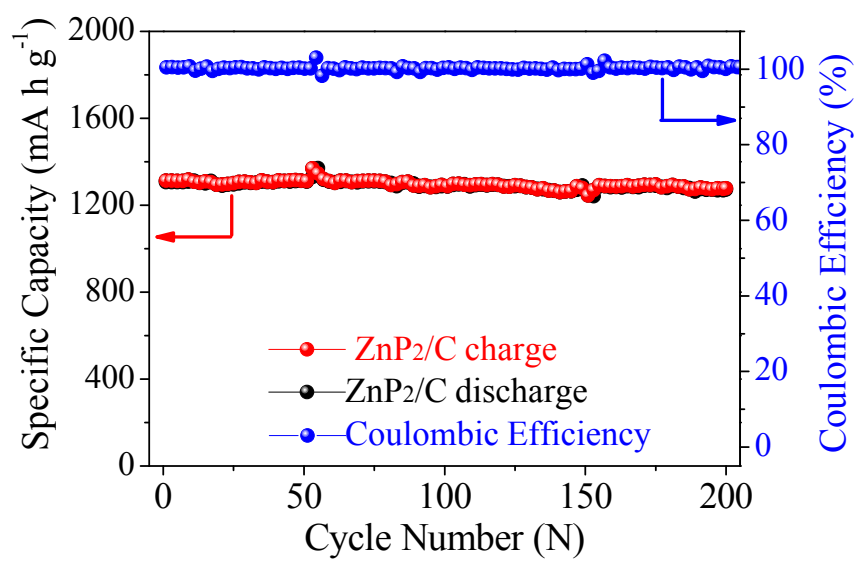


Figure S12. The cycle stability of the Li-ion full cell LiCoO₂//ZnP₂/C at a current density of 200 mA h g⁻¹.