

Electronic Supplementary Information

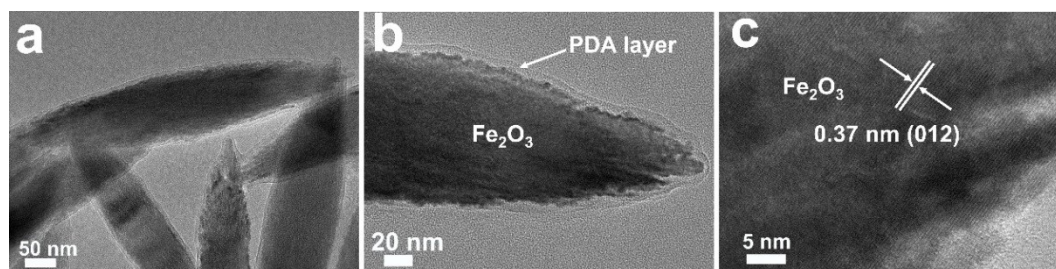


Fig. S1. TEM and HRTEM images of Fe₂O₃@PDA.

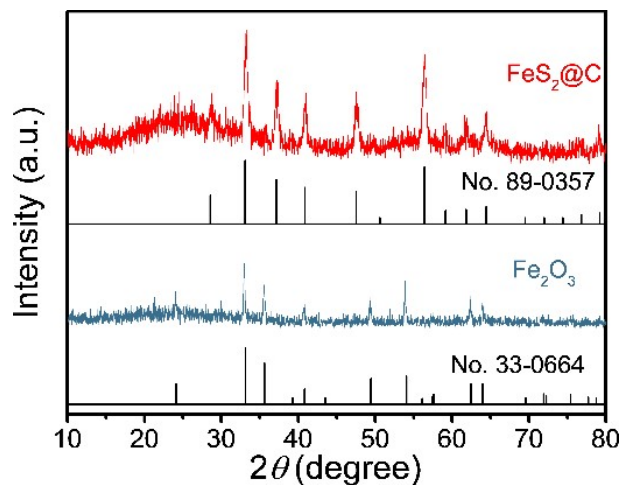


Fig. S2. XRD patterns of Fe₂O₃ and FeS₂@C.

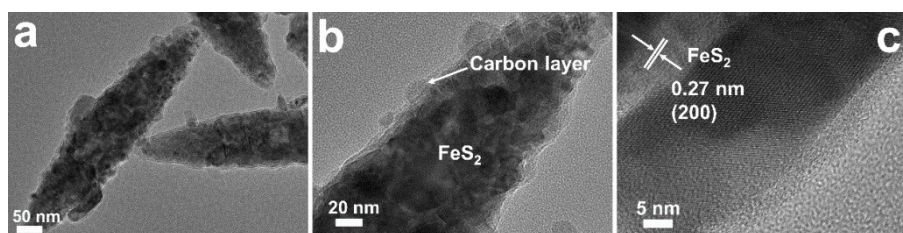


Fig. S3. TEM and HRTEM images of FeS₂@C.

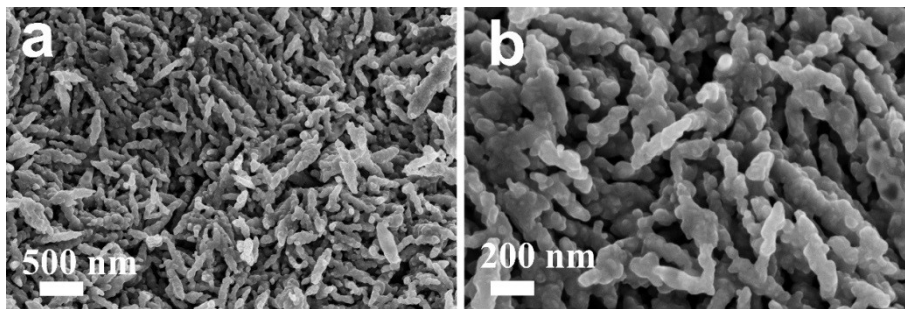


Fig. S4. SEM images of bare FeS₂ without carbon coating.

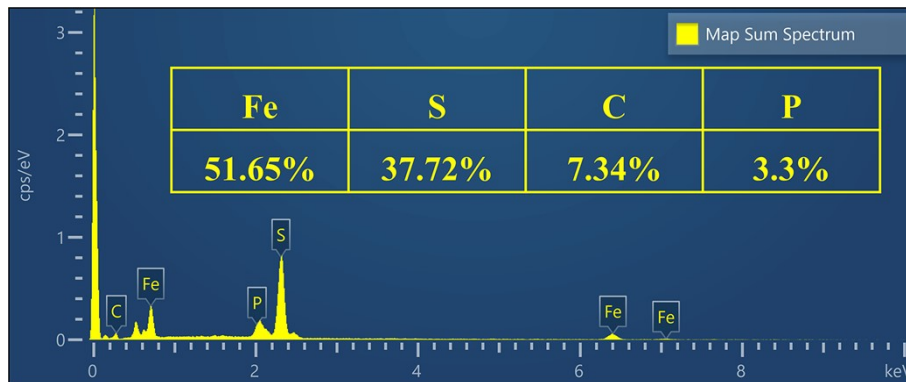


Fig. S5. The EDX spectrum of P-FeS₂@C material.

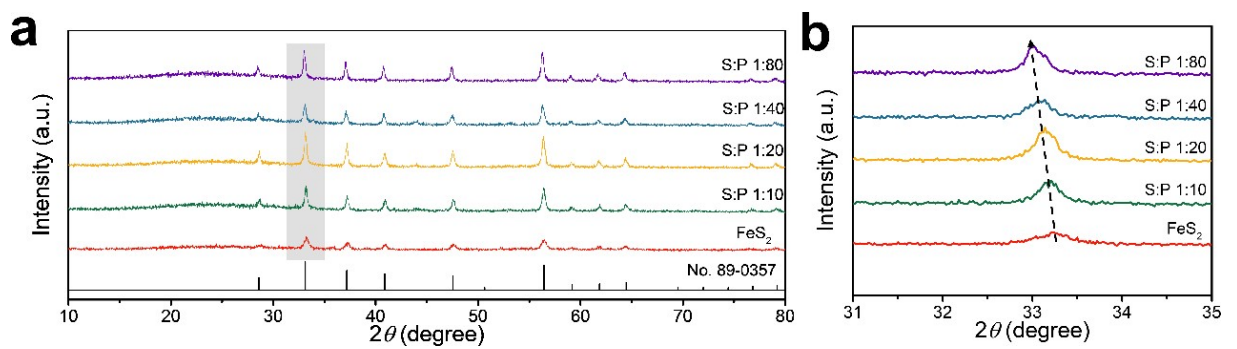


Fig. S6. XRD patterns of FeS₂@C with different doping contents and partial enlarged detail.

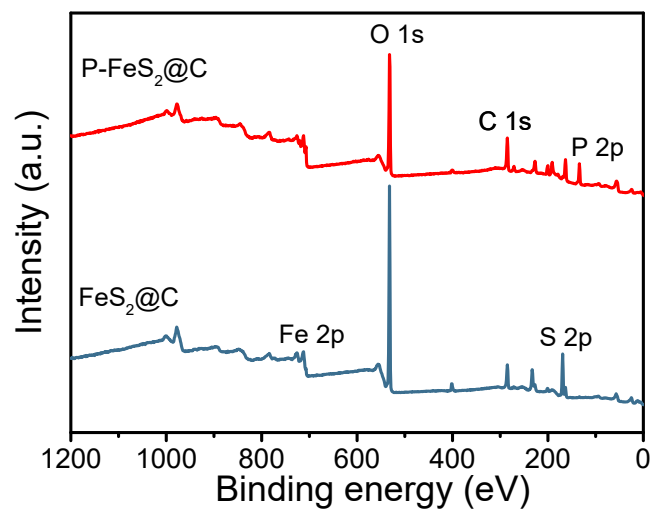


Fig. S7. XPS survey spectra of FeS₂@C and P-FeS₂@C.

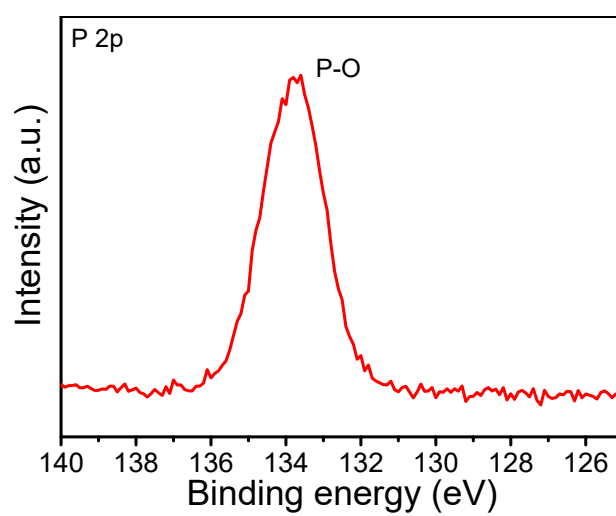


Fig. S8. P 2p XPS spectrum of P-FeS₂@C.

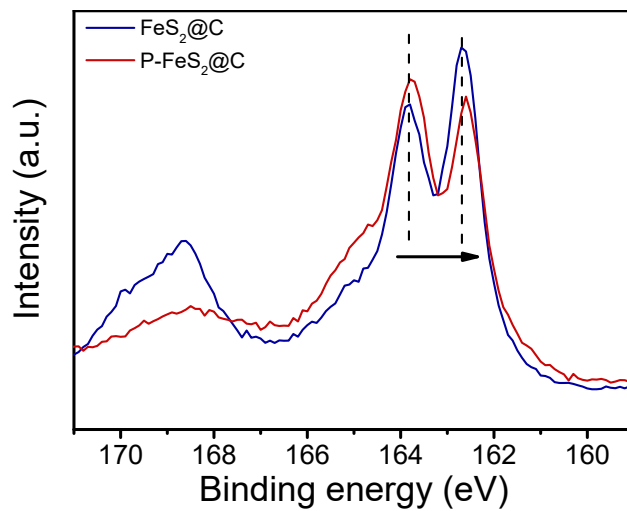


Fig. S9. S 2p XPS spectra of FeS₂@C and P-FeS₂@C.

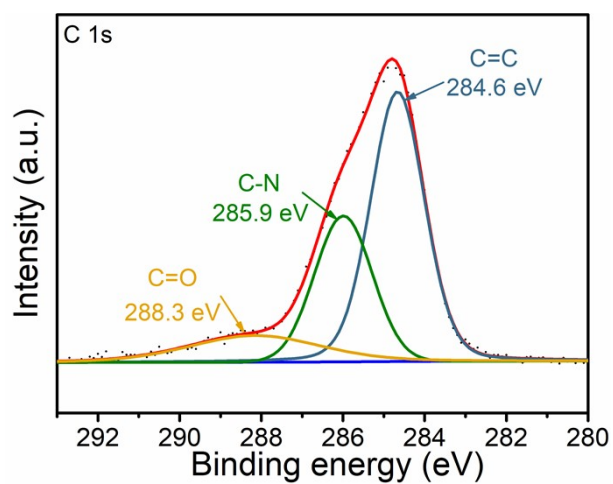


Fig. S10. C 1s XPS spectrum of P-FeS₂@C.

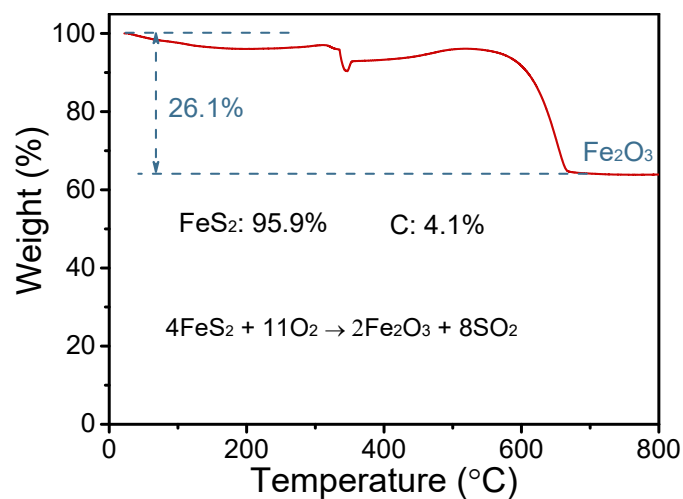


Fig. S11. TG curve of P-FeS₂@C.

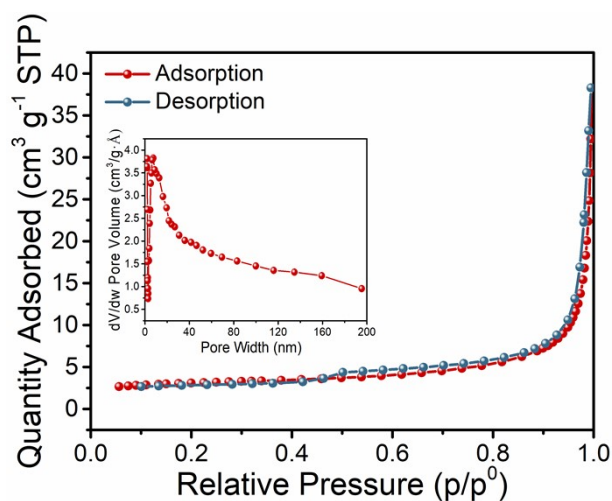


Fig. S12. The N₂ adsorption-desorption isotherms and inset of porous size distribution curves of P-FeS₂@C.

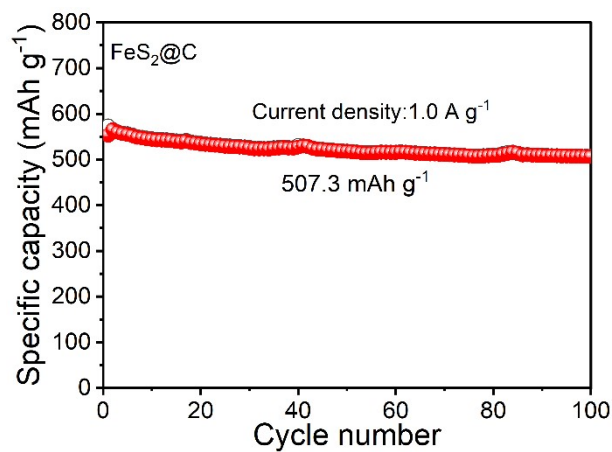


Fig. S13. Cycling performance of FeS₂@C under 1.0 A g⁻¹.

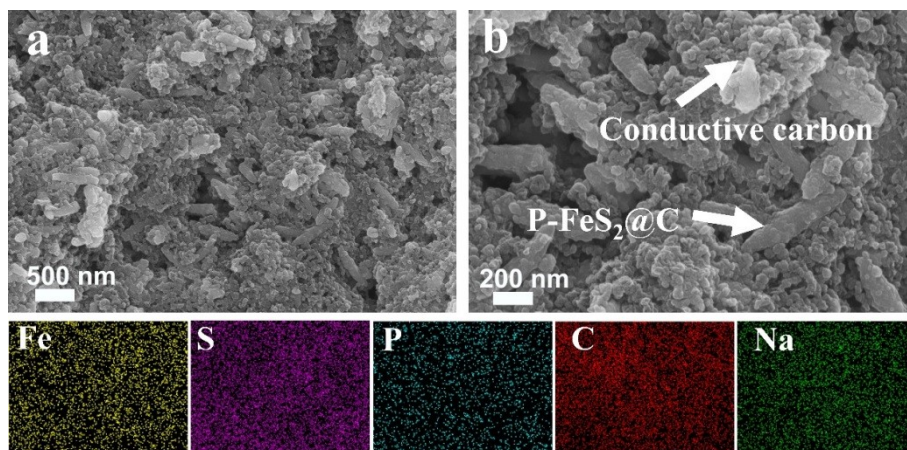


Fig. S14. SEM and elemental mapping images of P-FeS₂@C electrode after cycling.

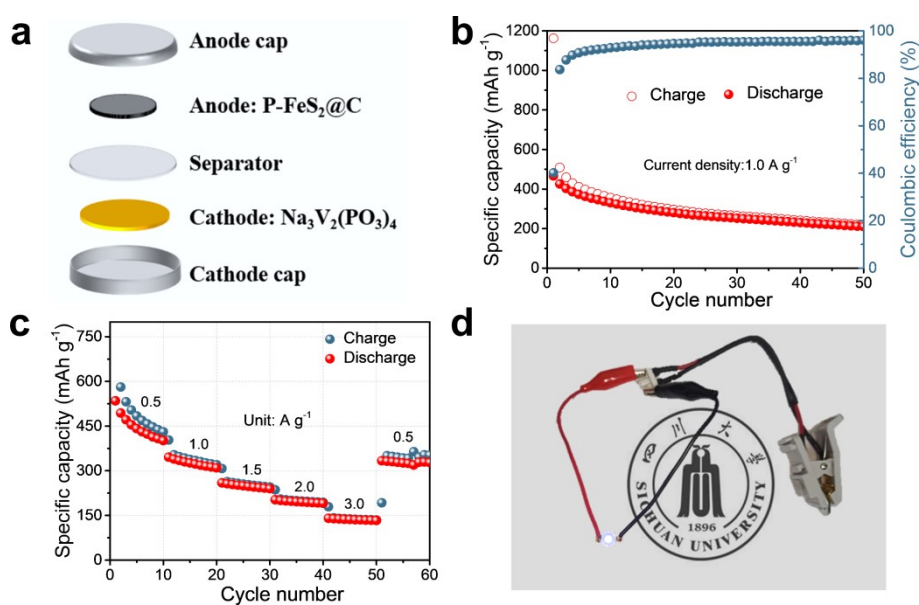


Fig. S15. (a) Schematic diagram of P-FeS₂@C||Na₃V₂(PO₄)₃ full battery. (b) Cycling performance at 1.0 A g⁻¹, (c) rate capability of full battery. (d) Photograph of a charged full cell lighting light-emitting diode.

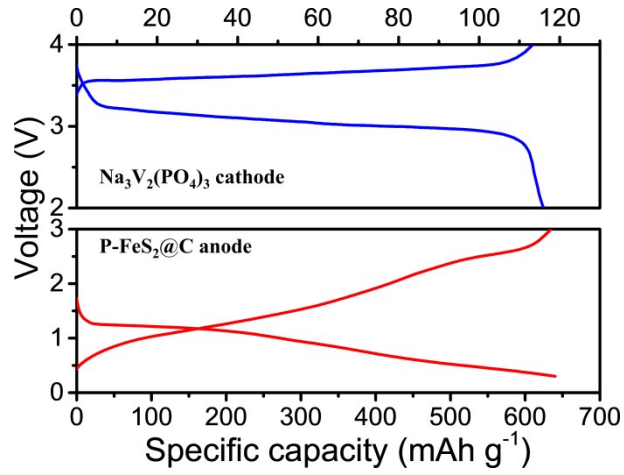


Fig. S16. The discharge/charge profiles of P-FeS₂@C anode and Na₃V₂(PO₄)₃ cathode.

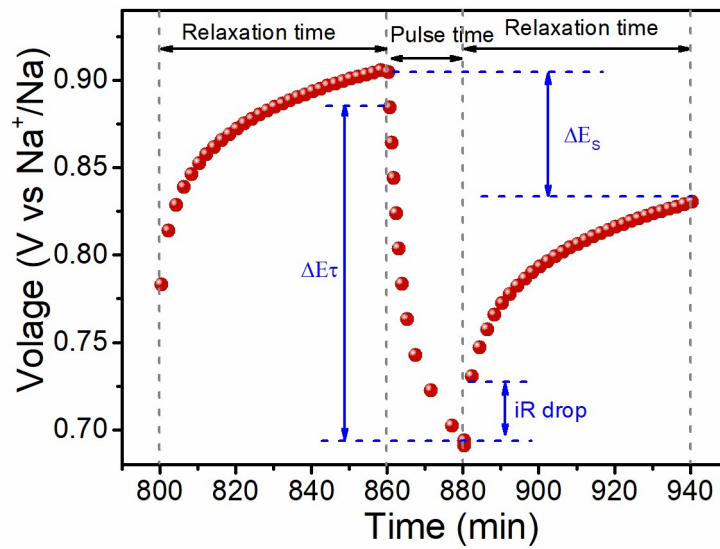


Fig. S17. E vs. t curves of P-FeS₂@C electrode in a signal GITT during the discharge process.

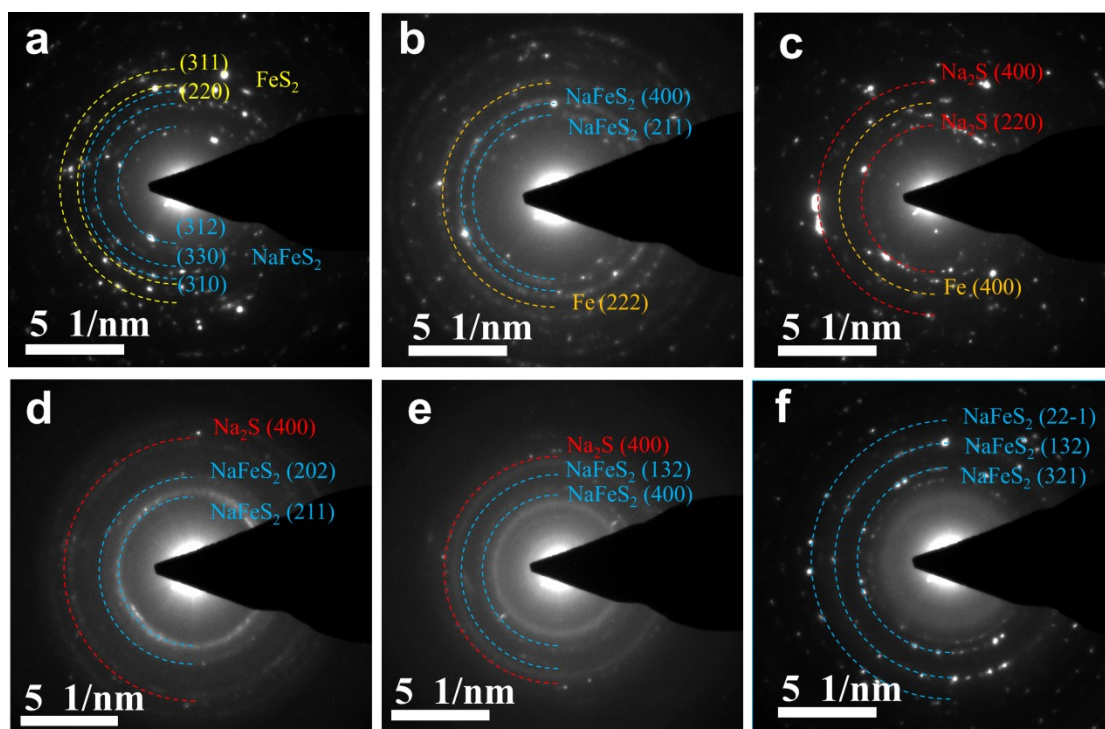


Fig. S18. SAED images of P-FeS₂@C anode in the initial discharge/charge state: (a-c) discharge to 1.5, 0.8, and 0.3 V, respectively; (d-f) charge to 1.2, 2.2, and 3.0 V, respectively.

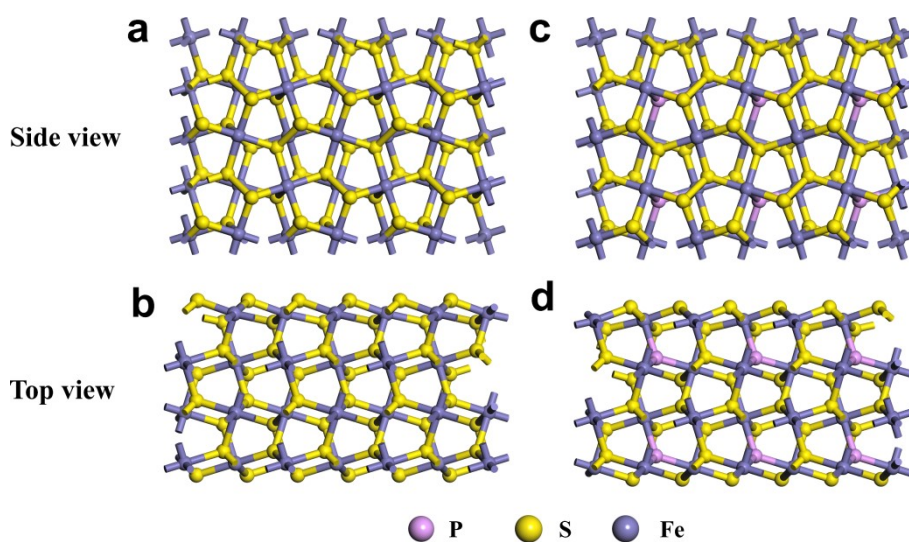


Fig. S19. The optimized geometry configurations of (a, b) pristine FeS₂ and (c, d) P-FeS₂ (200) plane.

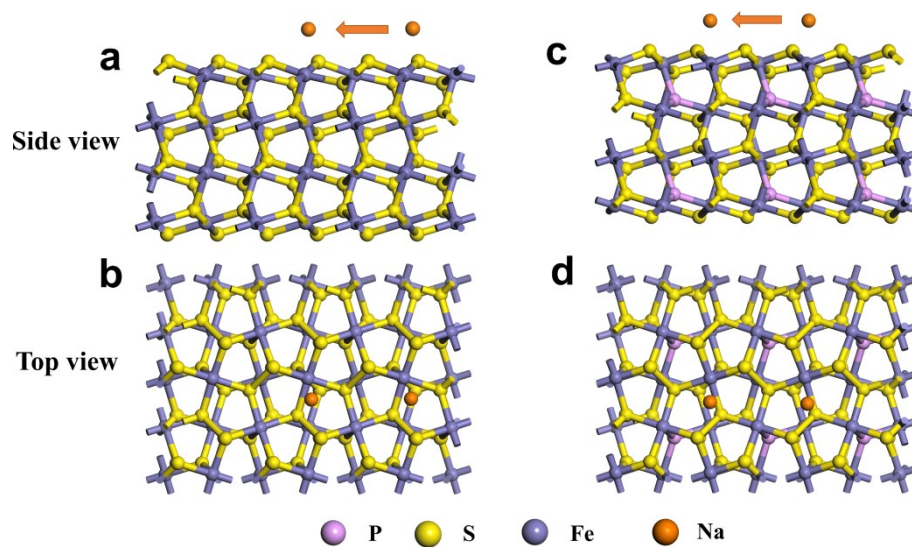


Fig. S20. The optimal diffusion path for Na^+ on (a, b) pristine FeS_2 and (c, d) P-FeS_2 .

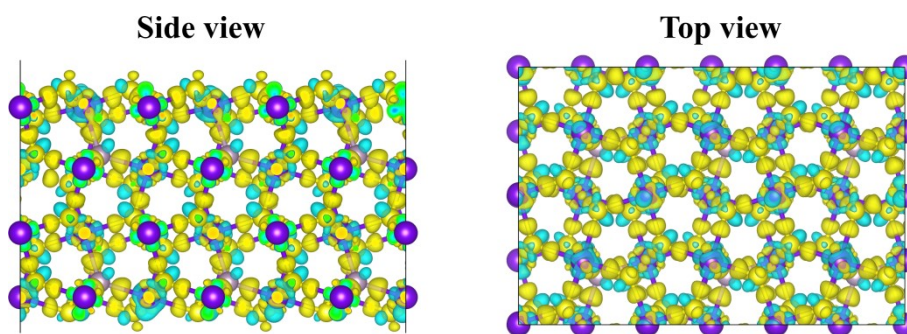


Fig. S21. The charge and spin density distribution after P doping.

Table S1. Calculated b values corresponding to the redox peaks in the CV curves of electrodes and capacitive contribution at 1.0 mV s^{-1}

	O1	O2	R1	R2	Capacitive contribution (1.0 mV s^{-1})
FeS ₂ @C	0.919	0.916	0.784	1.07	82.8%
S:P 1:10	1.04	0.708	0.854	1.17	85.4%
S:P 1:20	0.955	0.758	0.845	1.12	87.1%
S:P 1:40	0.911	0.835	0.867	1.01	86.5%
S:P 1:80 (P-FeS ₂ @C)	1.01	0.77	0.82	1.11	87.6%