Supporting Information

Novel core/shell CoSe₂@PPy nanoflowers for high-performance fiber asymmetric supercapacitors

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Figure S1.(a-c) The diameters of CoSe₂@PPy-90, EACF and the as-fabricated ASC,

respectively.



Figure S2. XRD pattern of Co₃O₄/Ti sample.



Figure S3. XPS patterns of Co₃O₄/Ti sample.

There are two major peaks at binding energies of 779.92 and 795.3 eV with a spin-energy separation of 15.38 eV in the XPS spectra of Figure S1a. The two peaks could be assigned to Co $2p_{3/2}$ and Co $2p_{1/2}$, respectively, which demonstrates the presence of a Co₃O₄ phase. Futhermore, the fitting peaks at 781.5 and 796.3 eV are indexed to Co²⁺, whereas the peaks at 779.9 and 794.9 eV correspond to Co³⁺.¹⁻² In the O1s XPS spectra (Figure S1b), the peaks with with binding energies of 530.03 and 531.37 eV correspond to the lattice oxygen of spinel Co₃O₄ and the OH species absorbed onto the surface of the obtained microstructure. The peak at 532.87 eV can be ascribed to multiplicity of physical absorbed and chemisorbed water near the surface.¹



Figure S4. Electrochemical properties of CoSe₂@PPy-n (n=30, 60, 150 and 200).



Figure S5. Electrochemical properties of CoSe_{2/}Ti fiber.



Figure S6. Electrochemical properties of PPy on Ti fiber when polymerization for 90 s.







Figure S8. Comparison of CV curves for $CoSe_2$, PPy-90 and $CoSe_2$ @PPy-90 electrode at scan rate of 30 mV s⁻¹.



Figure S9. Cycle performance of CoSe2@PPy electrode at at current of 0.6 mA up to 6,000 cycles.







Figure 11. N₂ adoption and desorption isotherms curves of (a) pure CF and (b) EACF.



Figure S12. Electrochemical properties of EACF electrodes in mixed HNO₃:H₂SO₄(1:1) for 10 min under different potentials: (a-b) 2 V, (c-d) 3 V, (e-f) 3.5 V, (g-h) 4 V.



Figure S13. Electrochemical properties of EACF electrodes under 3.5 V for 10 min in different ratio of HNO₃:H₂SO₄: (a-b) 1:2, (c-d) 1:1, (e-f) 2:1, (g-h) 3:1.



Figure S14. Electrochemical properties of EACF electrodes in mixed HNO₃:H₂SO₄(2:1) for different time under 3.5 V: (a-b) 2 min, (c-d) 5 min, (e-f) 10 min, (g-h) 30 min.



Figure S15. XPS for CF activated in different conditions: (a) survey spectra, (b) O 1s core level spectra, (c) C 1s core level spectra.



Figure S16. EIS comparison for ASC and SSC device.



Figure S17. Electrochemical performance of CoSe₂@PPy-90 SSC: (a) CV curves, (b) galvanostatic charge/discharge curves.



Figure S18. (a) The ASC device bent for different angels. (b) GCD curves and (c) capacitance retention under different bending angles for ASC device.



Figure S19. CV curves of the ASC device connected in series and/or in parallel at scan rate of 30 mV s^{-1} .

			Ti@CoSe ₂ @PPy				
Sample/cm	EACF	Ti@CoSe ₂	30 s	60 s	90 s	150 s	200 s
Mass/g	0.00022	0.00344	0.00375	0.00381	0.00393	0.00409	0.00431

Table S1. The mass of samples.

Reference

- 1. Y. Y. Wang, L. Ying, J. Li, L. Gu, H. Y. Yuan, D. Xiao, ACS Appl. Mater. Interfaces, 2014,
- 6 (9), 6739-6747.
- 2. F. H. Su, X. M. Lv, M. H. Miao, Small, 2015, 11 (7), 854-861.