

Supporting Information

Design of hierarchical NiCoP/NiO with tunable electronic structure and strong chemical interface for advanced supercapacitors

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1. Chemicals

All the chemical reagents with analytical grade utilized directly without any treatment. Sodium hydroxide (NaOH), ammonium persulphate ((NH₄)₂S₂O₈), cobaltous nitrate hexahydrate (Co(NO₃)₂·6H₂O), nickel nitrate hexahydrate (Ni(NO₃)₂·6H₂O) and sodium hypophosphite (NaH₂PO₂·H₂O) were supplied by Sinopharm Chemical Reagents Co., Ltd. **Porous activated carbon (PAC, C196579) purchased from Aladdin.** Nickel foam (NF) were purchased from Suzhou Keshenghe Metal Materials Co., Ltd.

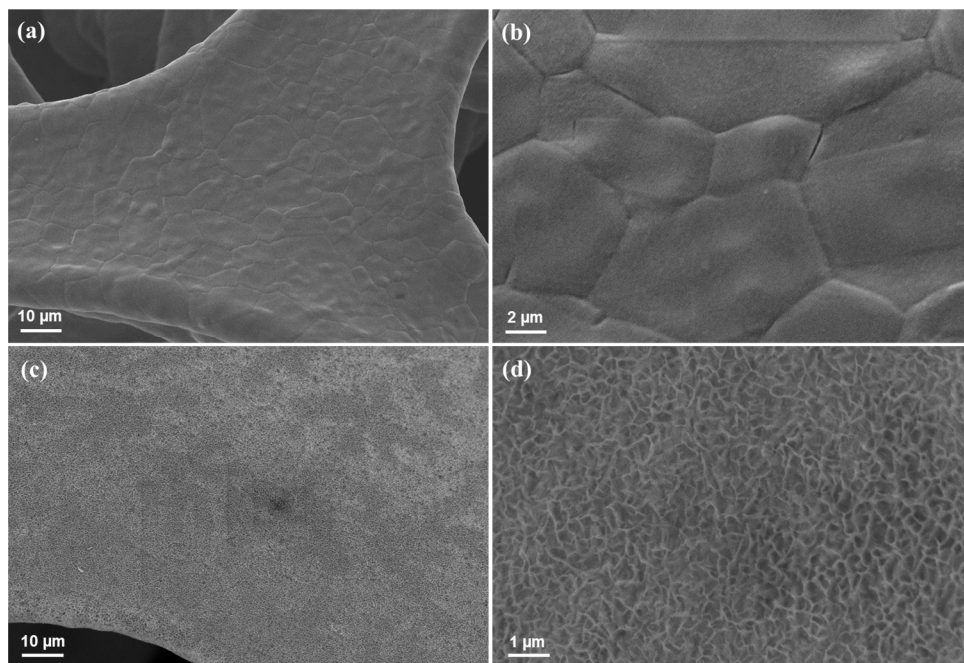


Figure S1. SEM images of (a, b) pure nickel foam and (c, d) NiO/NF at different magnifications.

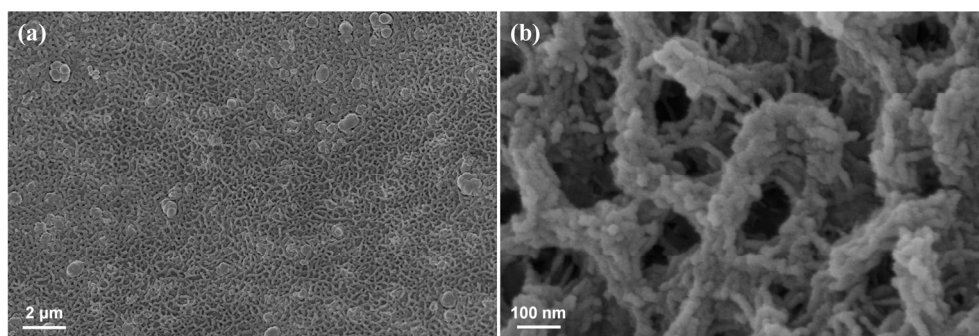


Figure S2. SEM images of NiCoP/NiO nanocomposites with **electrodeposition time of 15 min.**

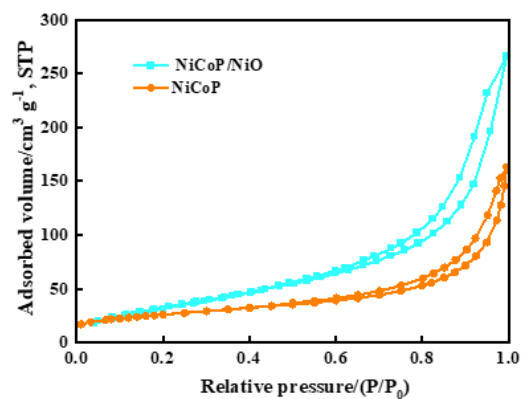


Figure S3. N_2 adsorption-desorption isotherms of the NiO/NiCoP and NiCoP.

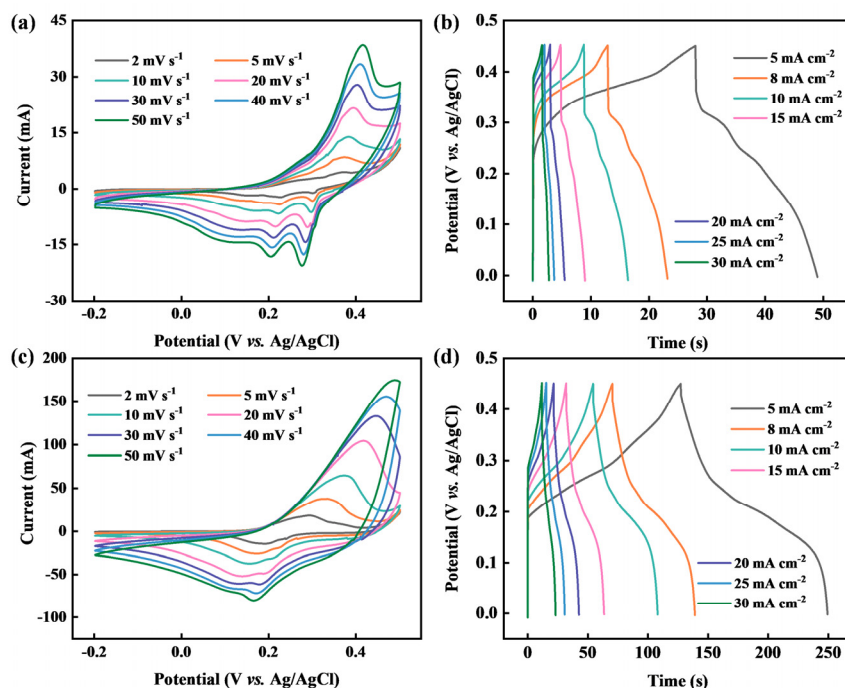


Figure S4. Electrochemical performance measured in a three-electrode system in 2.0 M KOH electrolyte: CV curves and GCD curves of the (a, b) NiO/NF and (c, d) NiCoP/NF electrodes, respectively.

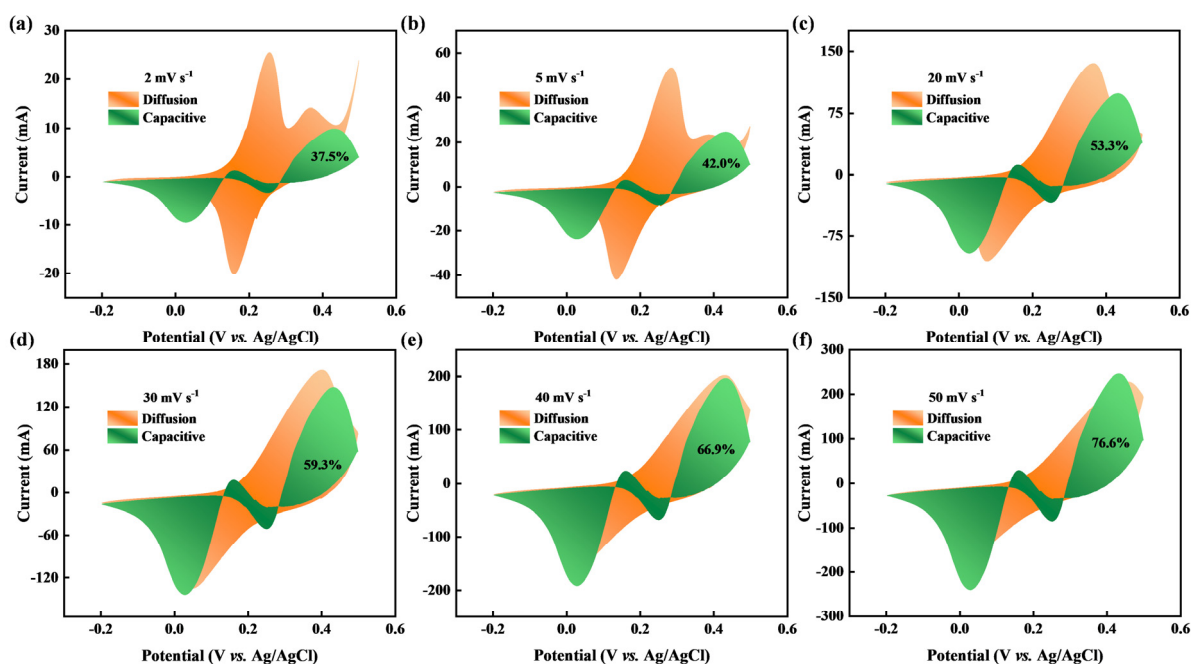


Figure S5. Separation of the surface and diffusion-controlled currents at different scan rates for the NiCoP/NiO electrode.

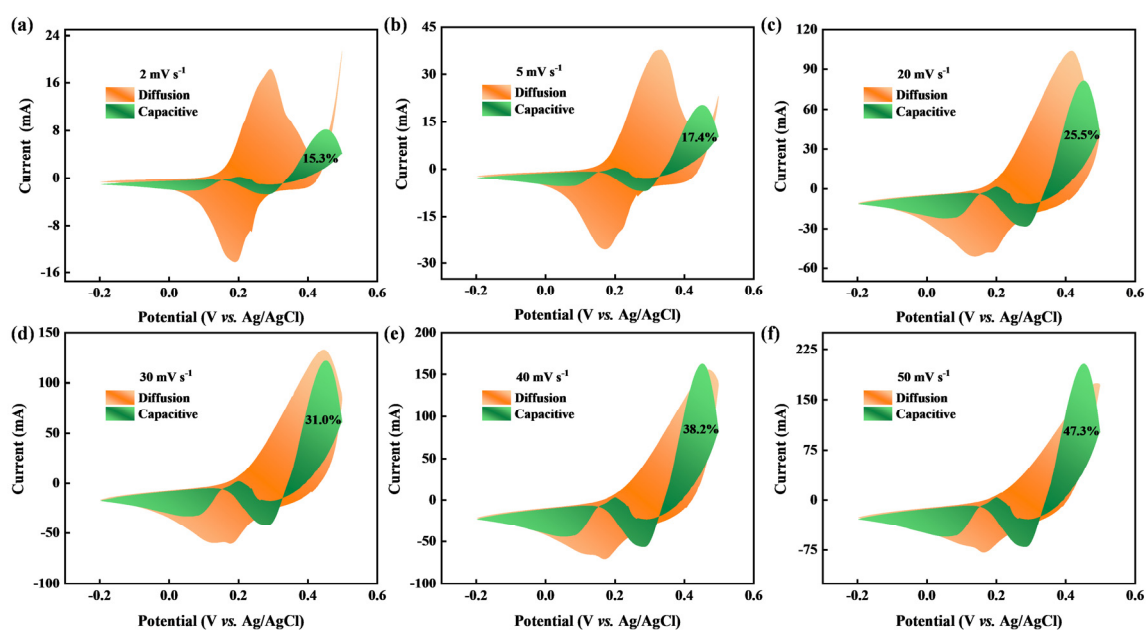


Figure S6. Separation of the surface and diffusion-controlled currents at different scan rates for the NiCoP/NF electrode.

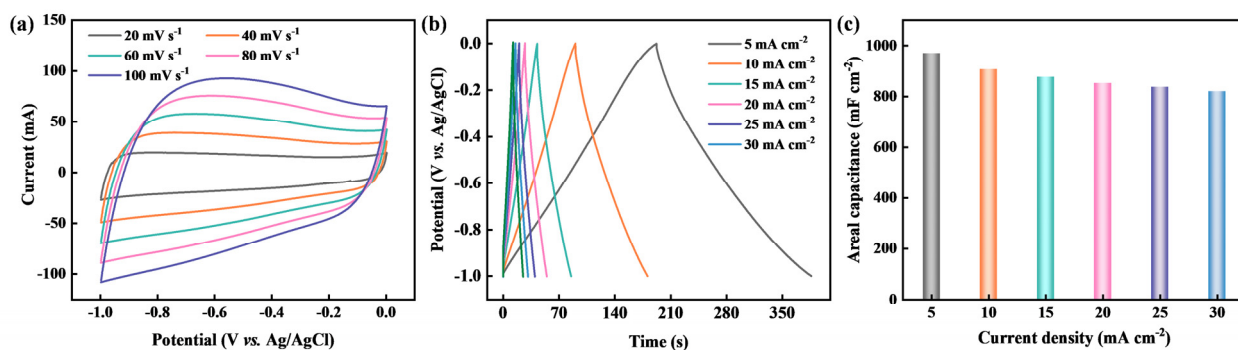


Figure S7. (a) CV curves, (b) GCD curves, and (c) areal specific capacitance of the PAC electrode.

Table S1. Comparative electrochemical performance of nickel-cobalt based nanocomposite materials reported by the literature.

Devices	Voltage (V)	Energy density ($\mu\text{Wh}/\text{cm}^2$)	Power density (mW/cm^2)	Cycling stability
NF/NiO/NiCo ₂ S ₄ //AC/NF ^[1]	1.2	25.4	0.782	90% (20 mA cm ⁻² , 2000 C)
NiCo ₂ S ₄ @NiCoP/NF//AC ^[2]	1.5	135	0.755	/
NiCo ₂ S ₄ @CNT//Ti ₃ C ₂ T _x @CCT ^[3]	1.5	180	2	87% (/, 2000 C)
NiCo ₂ O ₄ NG@CF//PC@CF ^[4]	1.65	9.46	0.6084	92% (2 mA cm ⁻² , 3000 C)
Co _{0.8} Ni _{0.2} Se ₂ //AC ^[5]	1.8	71	0.75	48% (1 mA cm ⁻² , 8000 C)
Ni _a Co _b S@NF//AC ^[6]	1.2	1.25	6	88% (/, 6500 C)
NiCoP/NiO//PAC(This work)	1.6	173.7	1.6	74% (40 mA cm ⁻² , 5000 C)

CNT: carbon nanotube film, CCT: carbon cloth threads, NG: nanograss, PC: porous carbon

References

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