Supporting Information

NiCo-Embedded in Hierarchically Structured N-Doped Carbon Nanoplates for Efficiently Electrochemical Determination of Ascorbic acid, Dopamine, and Uric Acid

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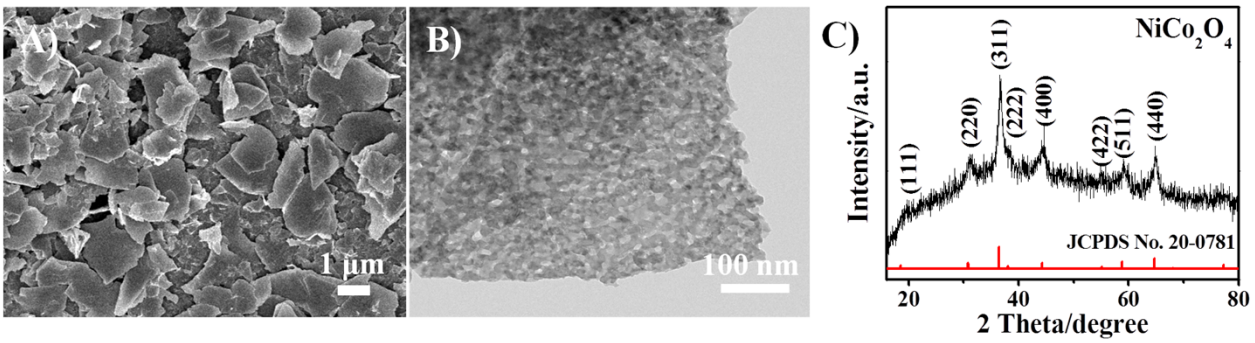

Figure S1. (A) SEM and (B) TEM images of $NiCo_2O_4$ sheets. (C) XRD pattern of $NiCo_2O_4$ sheets.

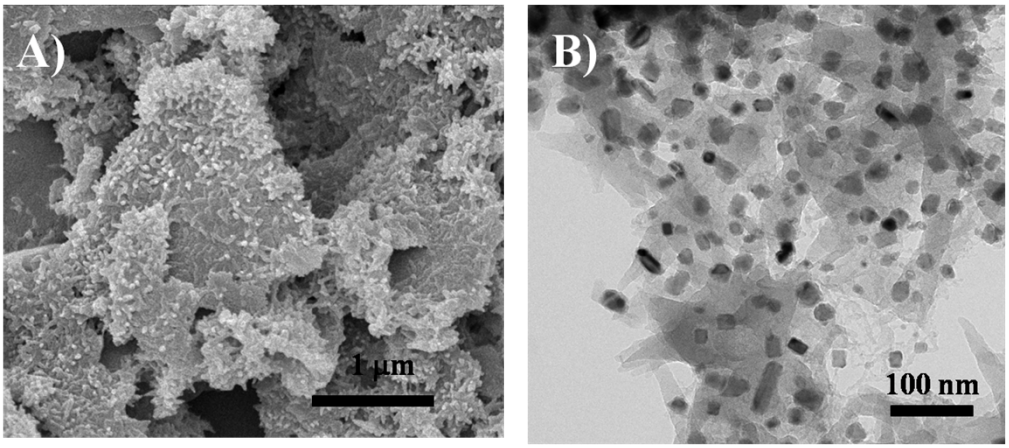

Figure S2. SEM and TEM images of NiCo-NPs-in-N/C nanoplates

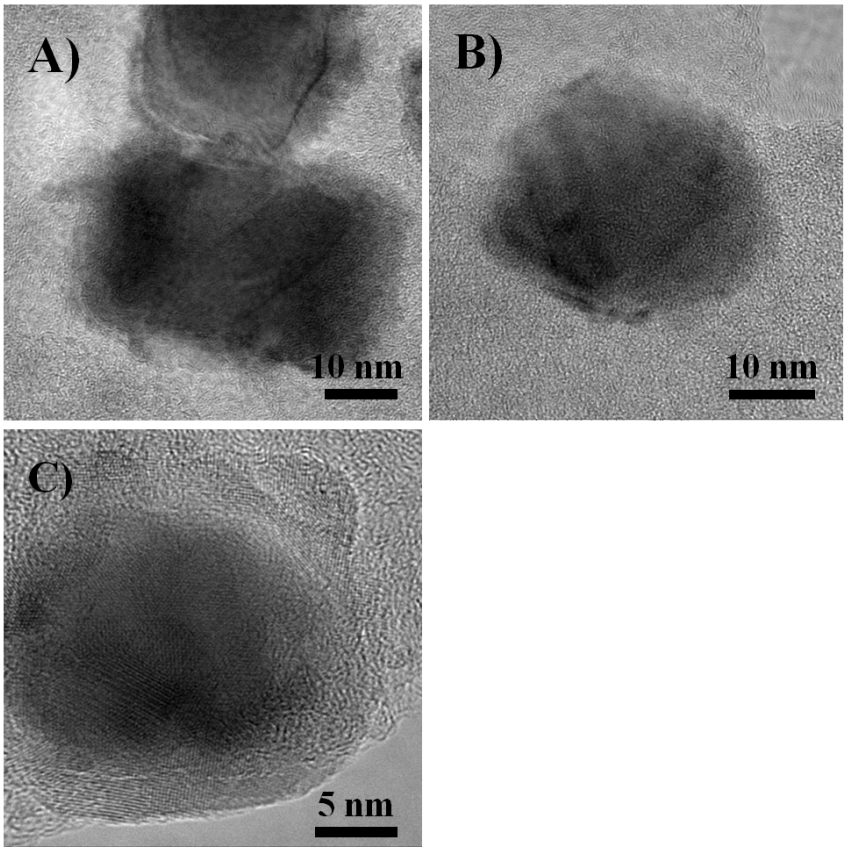

Figure S3. Large-magnified TEM images of NiCo-NPs-in-N/C.

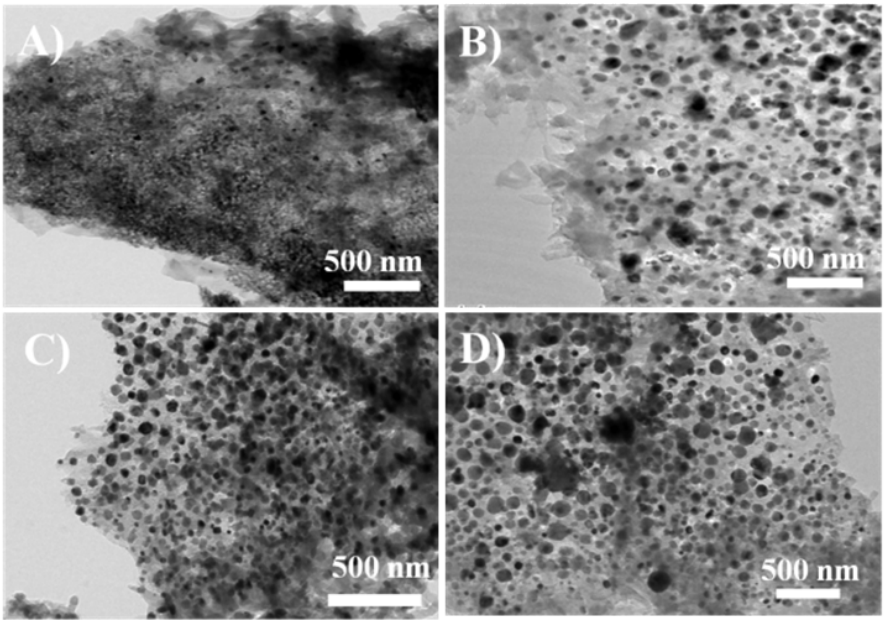

Figure S4. TEM images of $NiCo_2O_4$@PANI core-shell nanoplates carbonization at different temperature: (A) 350, (B) 550, (C) 750, and (D) 950 °C.

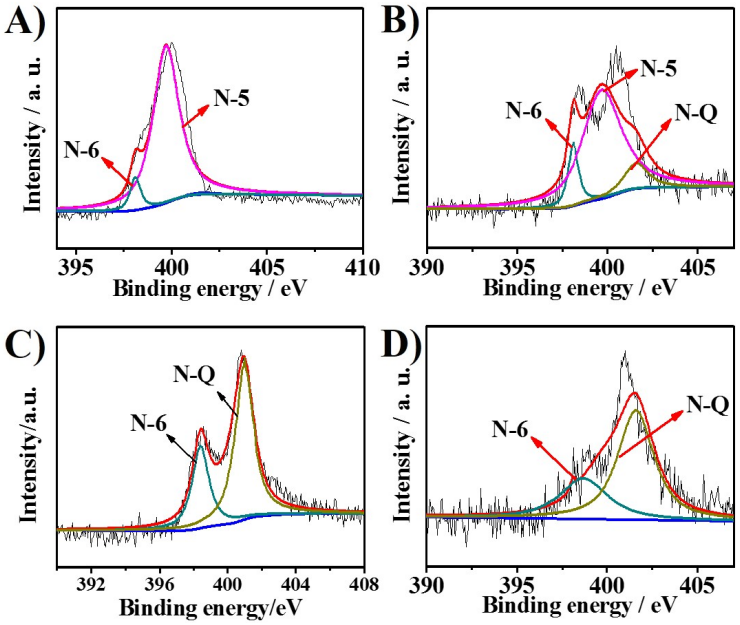

Figure S5. N1S spectrum of NiCo-NPs-in-N/C at different temperature: (A) 350, (B) 550, (C) 750, and (D) 950 °C.

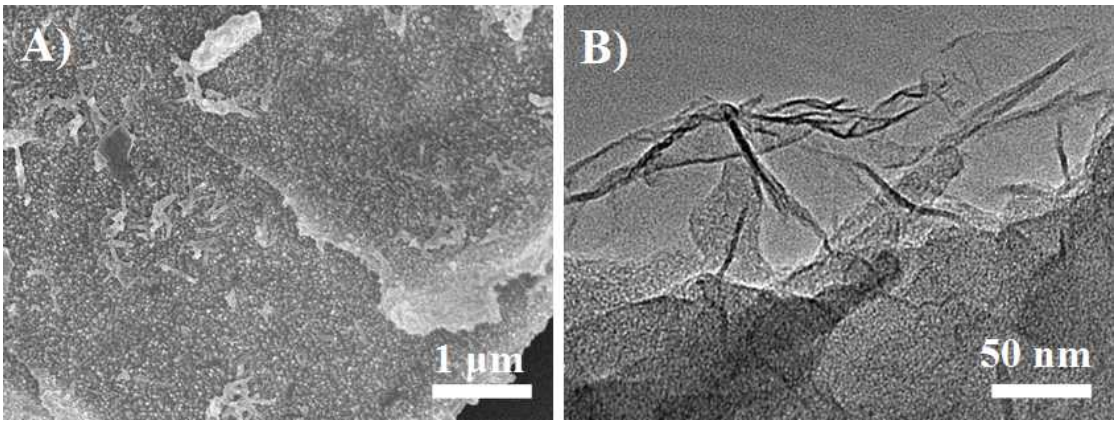

Figure S6. (A) SEM and (B) TEM images of graphene@N/C structure.

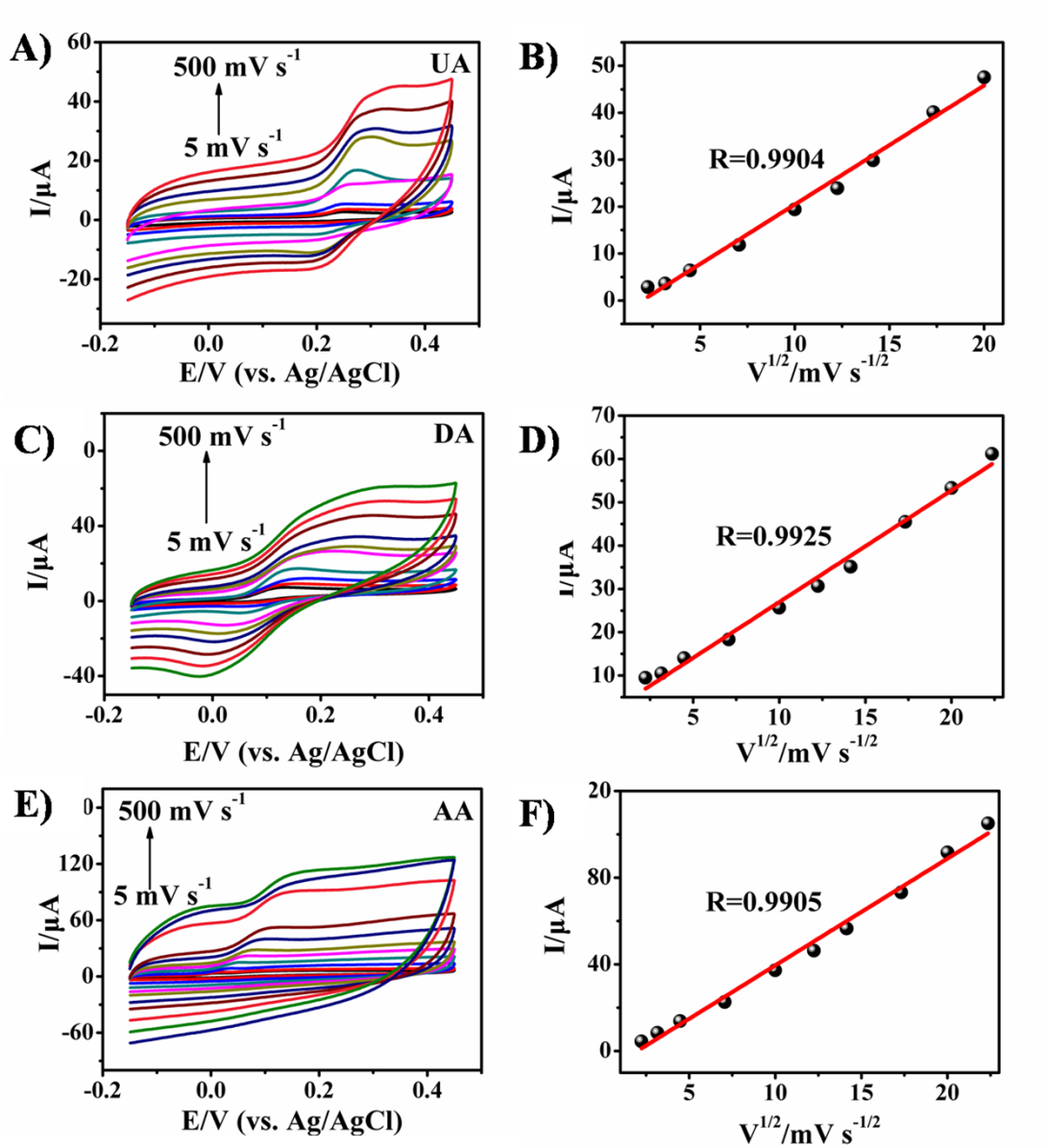

Figure S7. CVs at the NiCo-NPs-in-N/C electrode in 0.1 M PBS (PH 7.0) (A) containing 1.0 mM UA at different scan rate from 5 to 500 mV s^{-1} and (B) plots of I_{peak} *vs.* scan rate, (C) containing 1.0 mM DA at different scan rate from 5 to 500 mV s^{-1} and (D) plots of I_{peak} *vs*. scan rate, (E) containing 1.0 mM AA at different scan rate from 5 to 500 mV s^{-1} and (F) plots of I_{peak} *vs* scan rate.

Table S1 Comparison of the analytical performance of the different catalysts for the simultaneous determination of AA, DA and UA.

Electrode materials	Linear range (μM)			Detection limit (μM)			References
	AA	DA	UA	AA	DA	UA	
Multi walled carbon nanotube modified carbon-ceramic electrode	15–800	0.5–100	0.55–90	7.71	0.310	0.420	1
3DGF/ZnO NWAs	0.5-40	0.5-40	5-80	0.5	0.5	5	2
Cu nanoparticles–poly (sulfonazo III)	0.30-730	0.02-65	0.25-107	0.15	0.01	0.1	3
Fe_3O_4/r-GO	160-7200	0.4-3.5	4-20	20	0.08	0.5	4
Hollow nitrogen-doped carbon microspheres	100-1000	5-70	3-30	0.910	0.020	0.040	5
Nitrogen doped graphene	5-1300	0.5-170	0.1-20	2.20	0.25	0.045	6
Nitrogen doped porous carbon nanopolyhedra	80-2000	0.5-30	4-50	0.740	0.011	0.021	7
Templated nanoporous carbons	80-1400	0.4-60	10-70	0.012	4.03	0.605	8
NiCo-NPs-in-N/C	50-1500	0.5-900	10-500	0.091	0.080	0.014	This work

Table S2 Determination of AA, DA and UA in samples.

Samples	Added (mM)	Found (mM)	Recovery (%)	RSD $(\%)_{n=5}$
AA	1.0	0.987	98.7	2.8
DA	0.05	0.0512	102.4	3.1
UA	0.1	0.102	102	3.3

References

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