Supporting Information for

N-doped mixed Co, Ni-oxides with petal structure as effective catalysts for hydrogen and oxygen evolution by water splitting

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Part 1. SEM image of the as-grown nano-petals

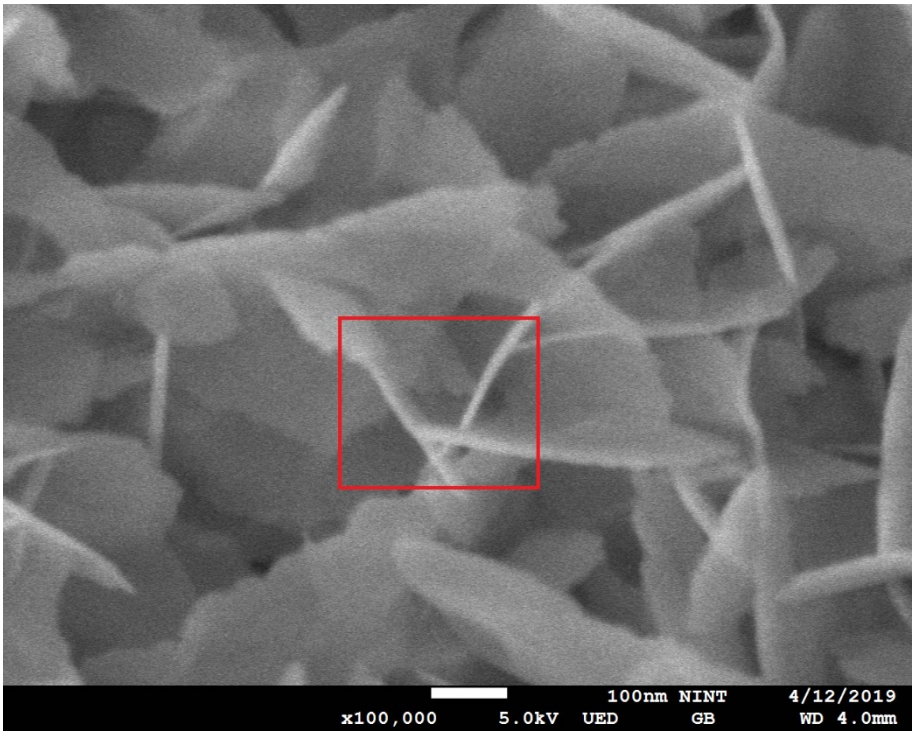

Fig. S1. SEM image of the nano-petals. Figure 2a in main text is taken from the red rectangle.

Part 2. Influence of the CTAB concentration over the morphology of samples

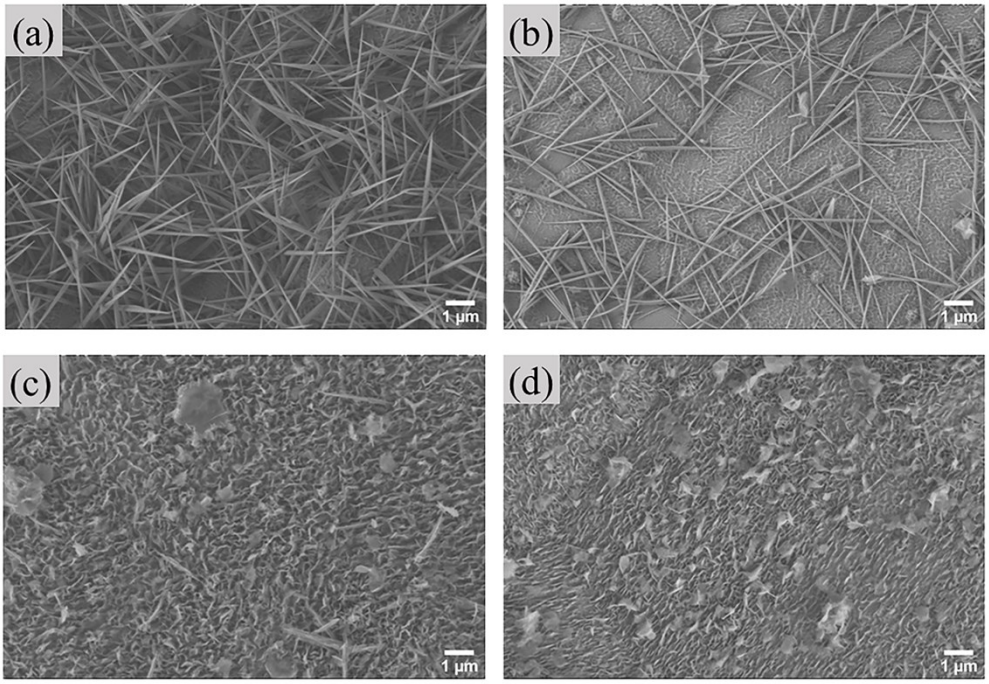

Fig. S2. SEM images of the as-grown samples obtained by using different CTAB concentrations: a) 0 mmol/L; b) 5 mmol/L; c) 10 mmol/L; d) 20 mmol/L.

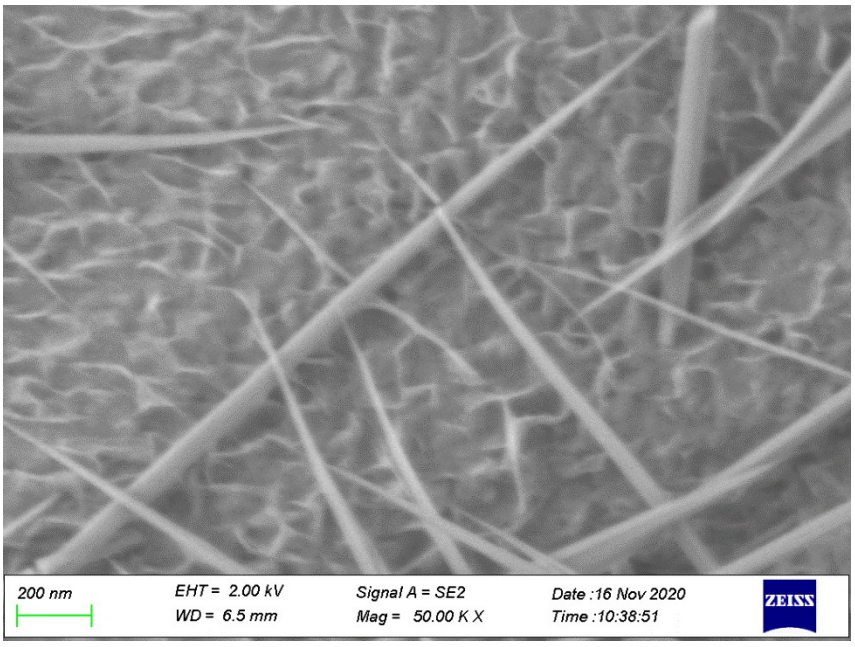

Fig. S3. Enlarged-view of Fig. S2 (b).

Part 3. The concentration list of doped nitrogen (at.%) (Not including C1s)

Urea Concentration (mmol/L)	Element	Start BE	Peak BE	End BE	FWHM eV	Area (P) CPS. eV	Area (N) TPP-2M	Atomic %
0	N1s	410.16	406.65	395.16	0.57	1648.37	0.01	1.36
	O1s	536.41	531.76	527.86	3.01	89263.47	0.43	44.98
	Co2p	810.46	781.42	775.36	4.69	130184.55	0.11	11.69
	Ni2p	887.86	855.9	850.16	3.37	54628.01	0.04	4.51
1.0	N1s	409.92	406.61	396.02	2.02	3338.08	0.03	2.2
	O1s	535.72	531.41	527.87	2.09	107237.27	0.51	43.1
	Co2p	811.22	781.08	775.02	3.86	149102.12	0.13	10.67
	Ni2p	888.62	855.79	850.12	2.65	59069.03	0.05	3.89
2.0	N1s	410.78	407.06	396.53	1.87	6735.09	0.05	4.51
	O1s	536.23	531.96	528.23	2.24	111168.16	0.53	45.39
	Co2p	811.13	781.56	775.83	3.72	143457.53	0.12	10.43
	Ni2p	888.33	856.23	851.33	2.54	53044.82	0.04	3.55
3.0	N1s	410.15	407.07	396.9	2.03	6018.97	0.05	4.49
	O1s	536.35	532	528.4	2.53	74769.07	0.36	33.98
	Co2p	811.05	781.45	774.95	3.97	86454.38	0.07	7
	Ni2p	888.75	856	850.05	2.58	29544.2	0.02	2.2

Table S1. By adjusting the concentration of urea in hydrothermal-solution, samples with different N-doping concentrations can be obtained. □

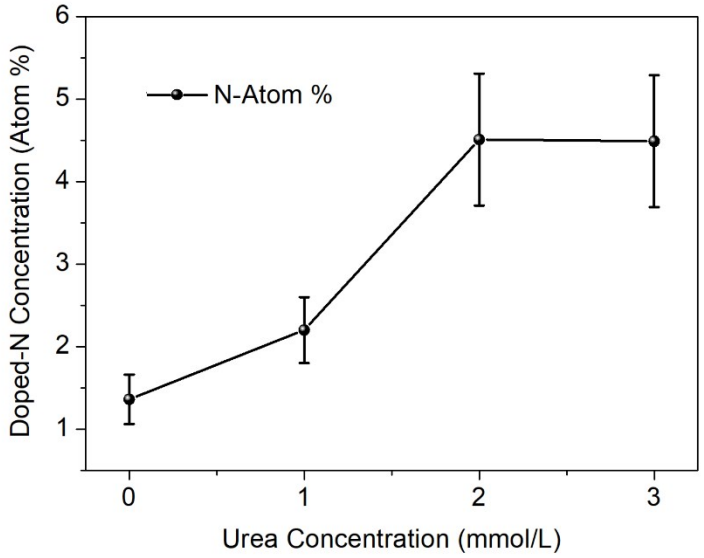

Fig. S4. The corresponding relationship between N-doping concentration in samples and urea concentration in hydrothermal-solution.

Part 4. Crystal structure modeling and three-dimensional electron cloud density distribution

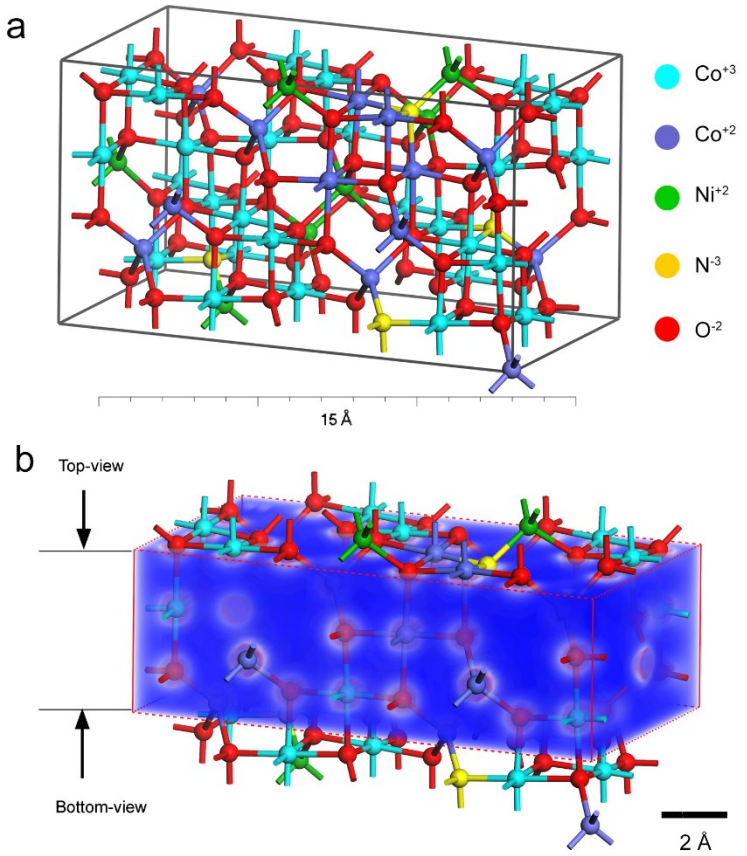

Fig. S5. Crystal structure modeling (a) and three-dimensional electron cloud density distribution (b).