SUPPORTING INFORMATION

Superior Catalytic Activity of α−$Ni(OH)_2$ for Urea Electrolysis

Tzu−Ho Wu, Bo−Wei Hou*

Department of Chemical and Materials Engineering, National Yunlin University of Science and Technology, 123 University Road, Section 3, Douliou, Yunlin 64002, Taiwan

*Corresponding Author: Dr. Tzu−Ho Wu (ORCID: 0000−0002−5192−8912)

Tel.: +886−5−534−2601 Ext. 4628

E−mail: wutzu@yuntech.edu.tw

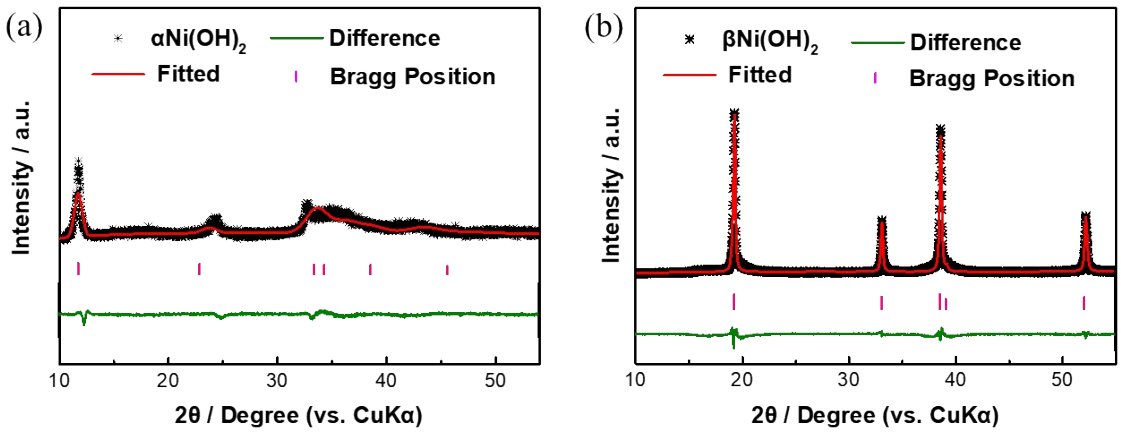

Figure S1 XRD refinement of (a) α−$Ni(OH)_2$ and (b) β−$Ni(OH)_2$.

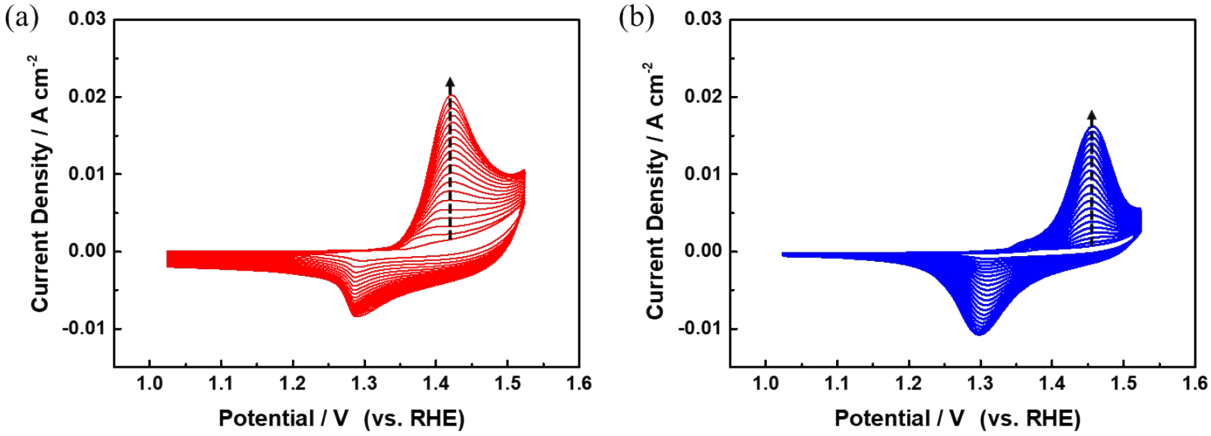

Figure S2 The initial 20 CV curves of (a) α−$Ni(OH)_2$ and (b) β−$Ni(OH)_2$ measured at the scan rate of 5 mV s^{-1} in the potential window of 1.02−1.52 V in 1 M KOH electrolyte.

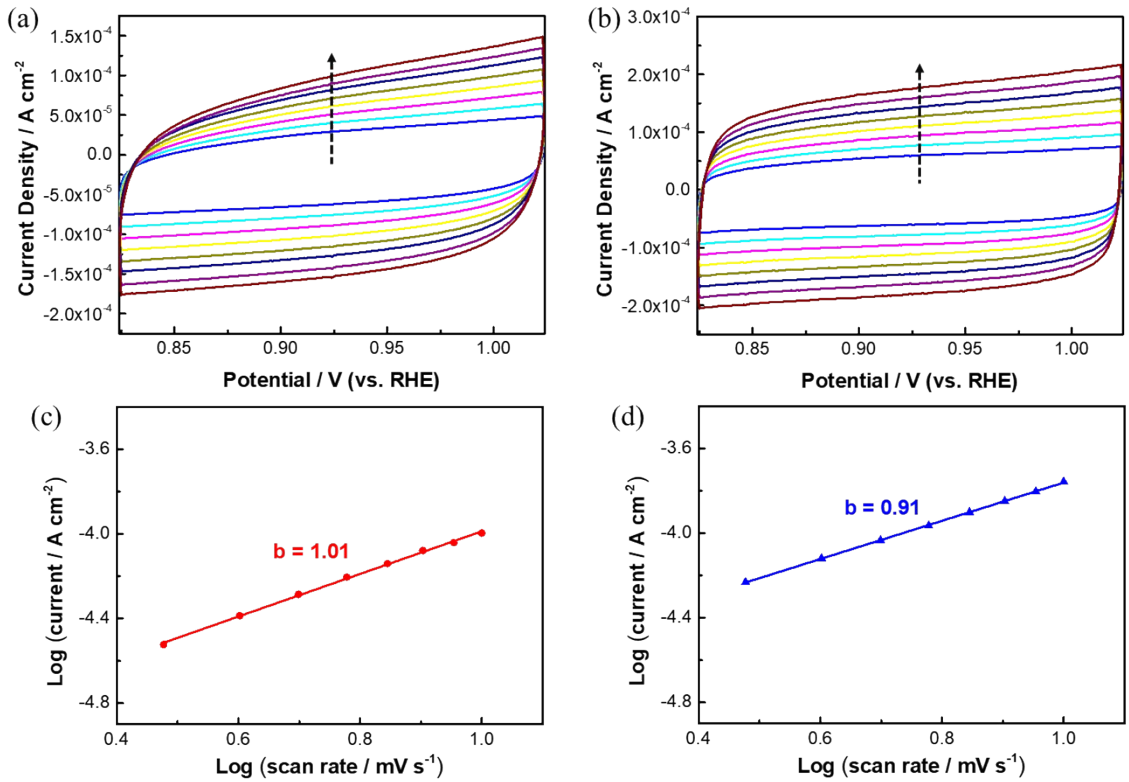

Figure S3 CV curves of (a) α−$Ni(OH)_2$ and (b) β−$Ni(OH)_2$ recorded at the scan rate of 30−100 mV s^{-1} in the potential window between 0.82 and 1.02 V for the evaluation of double−layer capacitance; b−value determination at 0.92 V of (c) α−$Ni(OH)_2$ and (d) β−$Ni(OH)_2$.

Table S1 Comparison of the UOR performance of catalysts reported in the literature.

Catalysts	Electrolyte	Onset potential (V vs RHE) at 10 mA/cm^2	Current density (mA cm^{-2}) at 1.5 (V vs RHE)
α-Ni(OH)$_2$ this work	**1 M KOH + 0.33 M urea**	**1.40**	**58**
Ni(OH)$_2$ nanomeshes[1]	1 M KOH + 0.33 M urea	1.35	~22
Ni(OH)$_2$ nanoflakes[2]	1 M KOH + 0.3 M urea	~1.42	~50
Ni(OH)$_2$ nanoparticles[3]	5 M KOH + 1 M urea	1.41	~82
Ni(OH)$_2$ nanotubes[4]	1 M KOH + 0.33 M urea	~1.41	~71
Ni(OH)$_2$ nanocups[5]	1 M KOH + 0.33 M urea	~1.47	~16
S-Ni(OH)$_2$[6]	1 M KOH + 0.33 M urea	1.32	~35
NiCr/C[7]	1 M KOH + 0.33 M urea	1.34	~62
LaNiO$_3$[8]	1 M KOH + 0.33 M urea	~1.41	~23
NiCo$_2$O$_4$[9]	1M KOH + 0.33 M urea	1.43	~22
NiMoO$_4$[10]	1 M KOH + 0.50 M urea	~1.37	~125

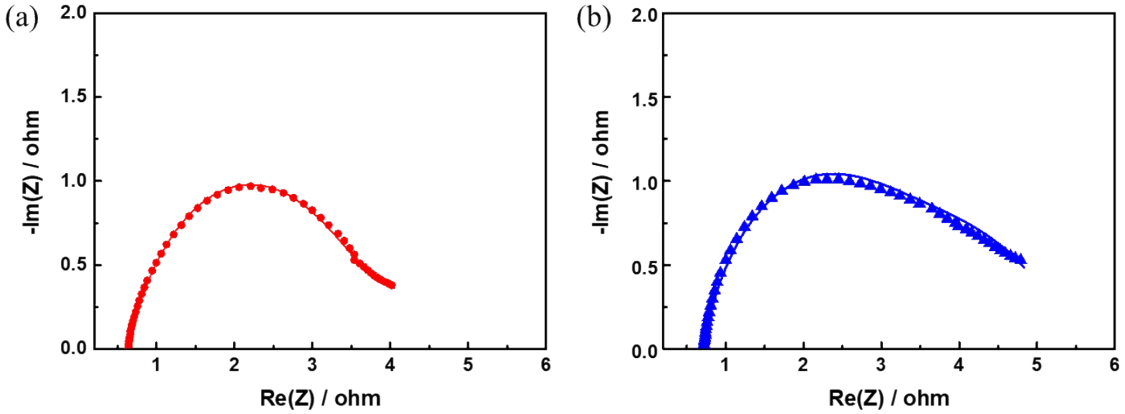

Figure S4 EIS fitting curves of (a) α−$Ni(OH)_2$ and (b) β−$Ni(OH)_2$ from Figure 5a.

Table S2 EIS fitting results of (a) α−$Ni(OH)_2$ and (b) β−$Ni(OH)_2$ from Figure 5a.

	R_s (Ω)	R_1 (Ω)	R_2 (Ω)
α−$Ni(OH)_2$	0.63	2.91	1.57
β−$Ni(OH)_2$	0.71	2.58	2.18

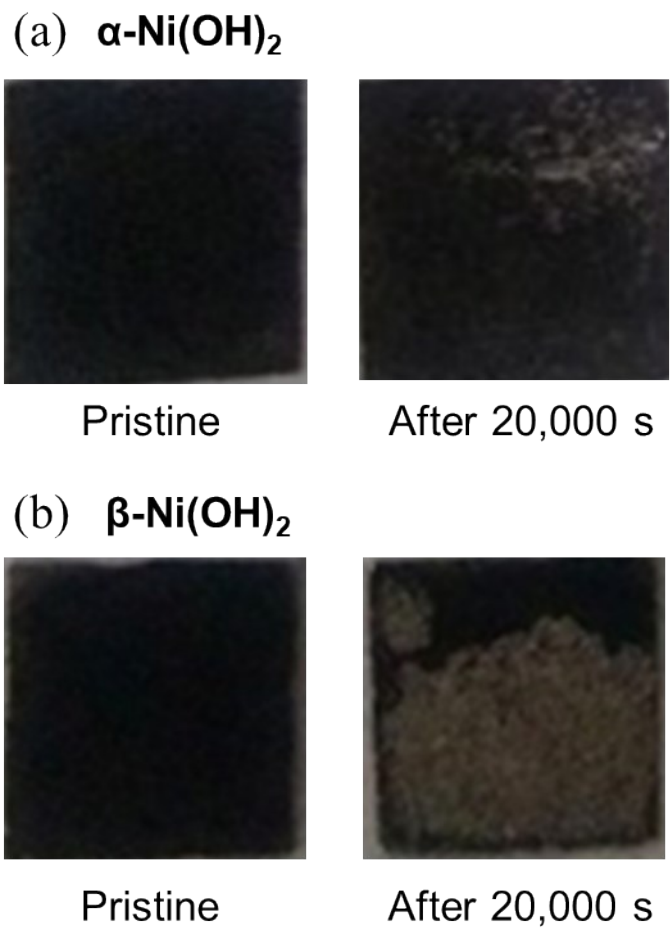

Figure S5 The photograph of the (a) α−$Ni(OH)_2$ and (b) β−$Ni(OH)_2$ electrode before and after stability tests.

Notes and references

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