

Supporting Information

Ce³⁺ ion regulated CoNi-hydroxides for ultrahigh rate supercapacitors

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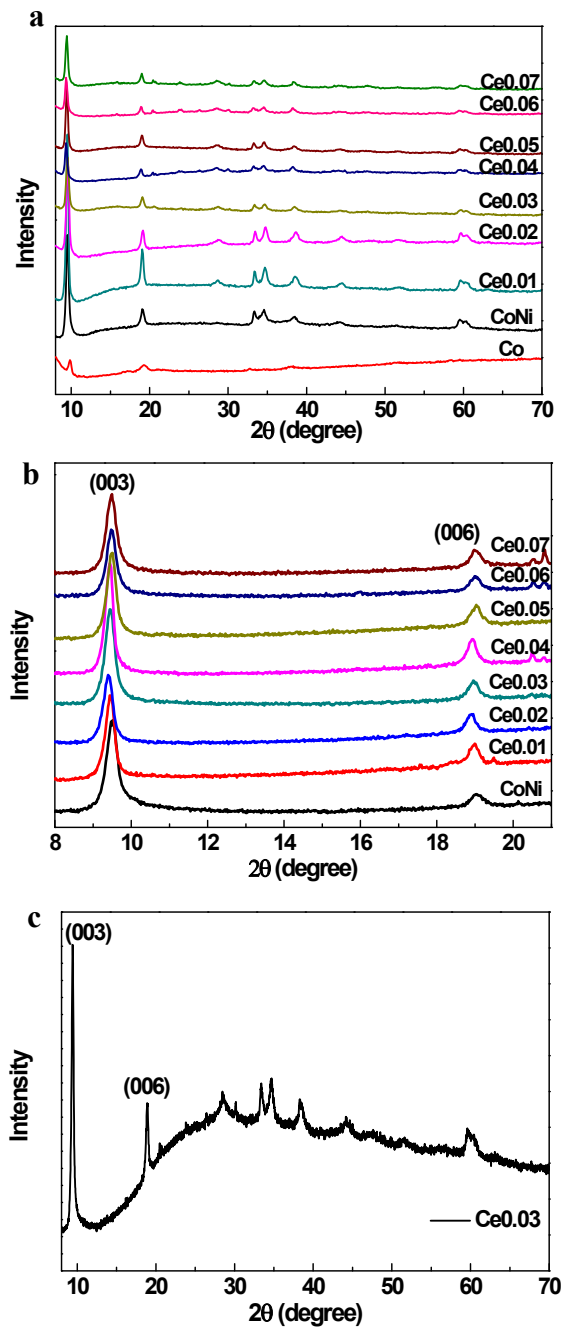


Figure S1 XRD patterns (a, b, c) of $\text{Ce}^{3+}:\text{CoNi}$ LDH samples.

Table S1 $\text{Co}^{2+}/\text{Ni}^{2+}$ and $\text{Ce}^{3+}/(\text{Co}^{2+}+\text{Ni}^{2+})$ mol ratio in $\text{Ce}^{3+}:\text{CoNi}$ LDH samples obtained from ICP and EDS, respectively.

No.	$\text{Ce}^{3+}/(\text{Co}^{2+}+\text{Ni}^{2+})$ ratio from ICP	$\text{Co}^{2+}/\text{Ni}^{2+}$ ratio from ICP	$\text{Ce}^{3+}/(\text{Co}^{2+}+\text{Ni}^{2+})$ ratio from EDS	Co/Ni ratio from EDS
CoNi	0	1.38	0	1.32
Ce0.01	0.022	1.12	0.012	1.02
Ce0.03	0.076	1.20	0.034	1.32
Ce0.05	0.115	1.12	0.046	1.02
Ce0.07	0.166	0.900	0.154	0.901

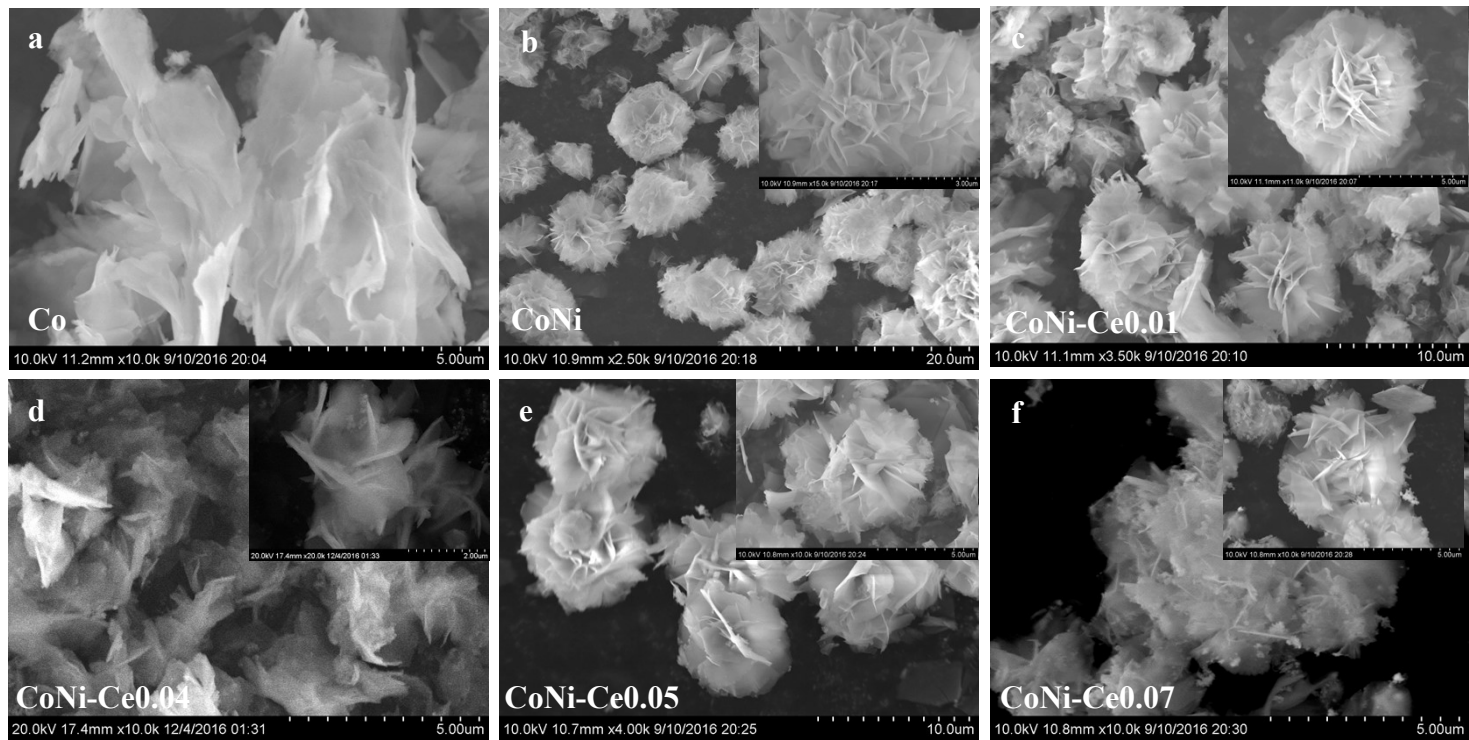


Figure S2 SEM images of (a) $\text{Co}(\text{OH})_2$, (b) Ce^{3+} unadded and (c-f) added CoNi-LDHs samples.

Table S2 Specific capacitances of Ce³⁺:CoNi-LDHs.

No.	Specific capacitance F/g at 1A/g (0.5 V)	Specific capacitance F/g at 50A/g	Capacitance retention %
Co	289	/	/
CoNi	1322	280	21
Ce0.01	1381	780	56
Ce0.03	1293	1000	77
Ce0.04	1194	739	62
Ce0.05	1117	740	66
Ce0.06	1033	528	51
Ce0.07	1069	690	64

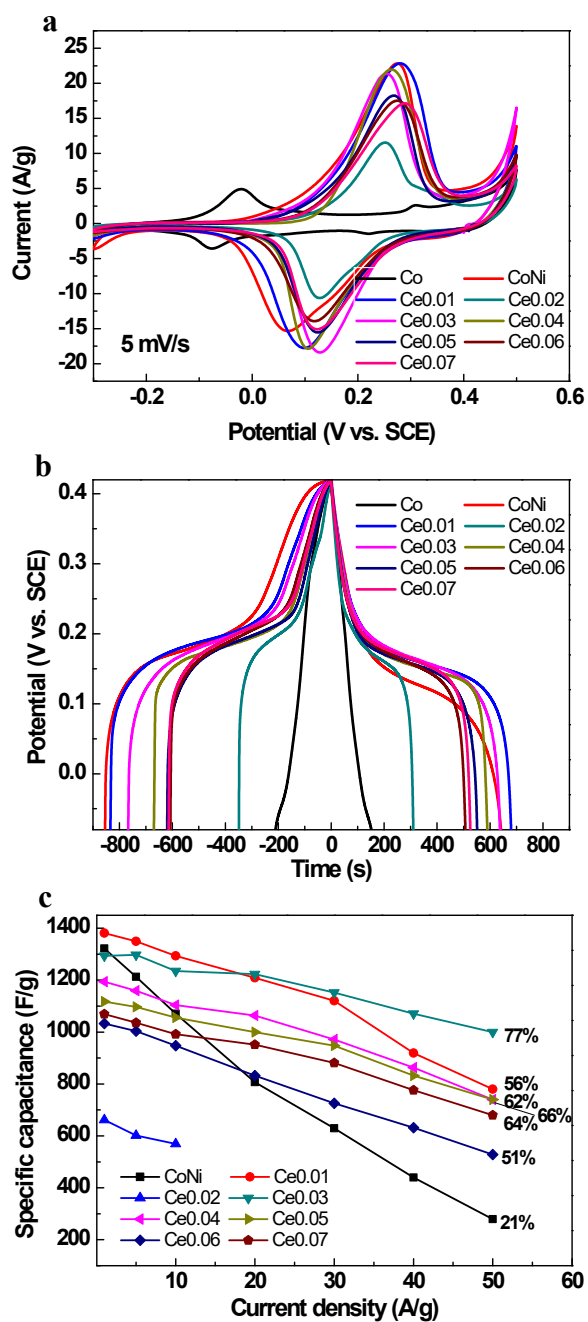


Figure S3 (a) CV curves of Ce³⁺:CoNi-LDHs at the scan rate of 5 mV/s. (b) Charge-discharge curves of Ce³⁺:CoNi-LDHs at the current density of 1 A/g. (c) Specific capacitance Vs. current density.

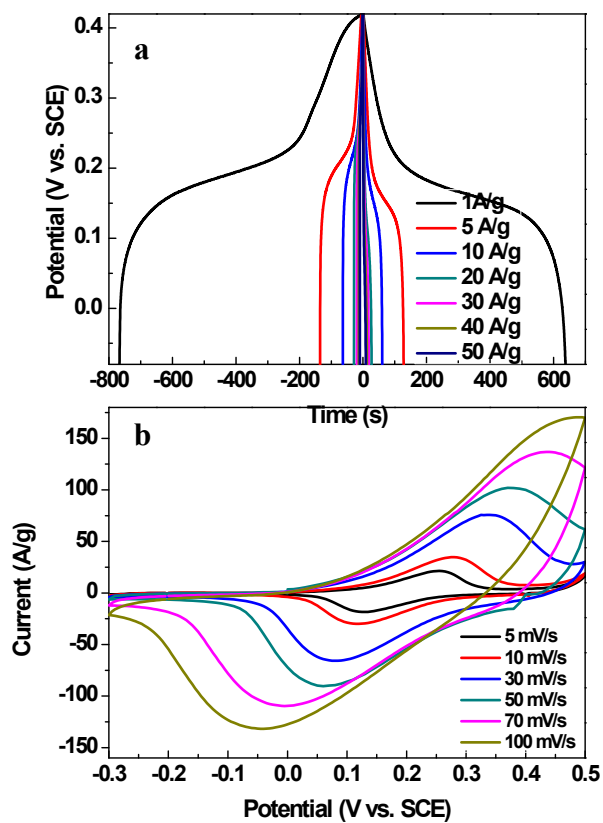


Figure S4 (a) Charge-discharge curves, (b) CV curves of Ce³⁺:CoNi-LDHs samples with adding 0.03 mmol Ce³⁺ (marked as Ce0.03).