Supplementary Materials

Hierarchical Core/Shell Structured Ag@Ni(OH)₂ Nanospheres as Binder-Free Electrodes for High Performance Supercapacitors

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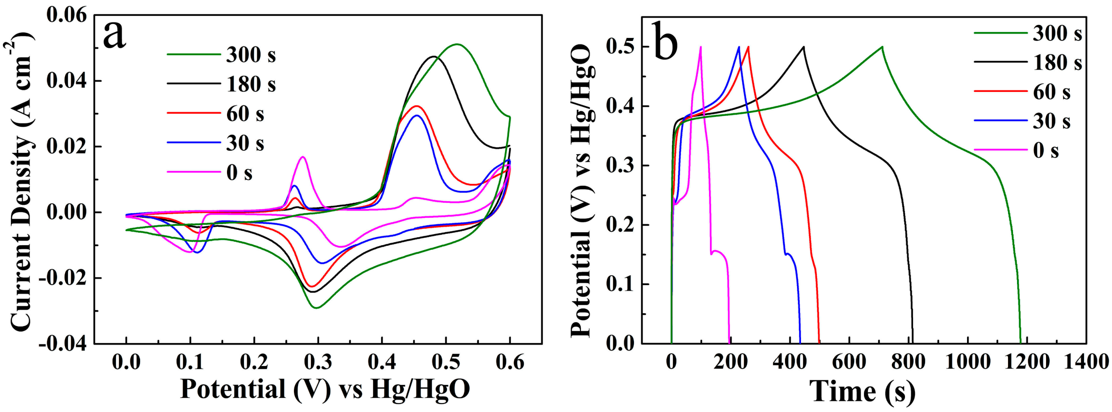

Figure S1. Ag@Ni(OH)₂ electrode corresponding to different Ni(OH)₂ deposition time: (**a**) CV curves; (**b**) GCD curves.

The specific capacitance of Ag@Ni(OH)₂ electrode can be obtained by the following equation:

$$C_S = \frac{\int I(V)dV}{2vS\Delta V}$$

where *Cs* (F cm^{-2}) is the specific capacitance, *I*(V) (A) is the response current, *V* (V) is the potential vs. Hg/HgO, *v* (V s^{-1}) is the scan rate, *S* (cm^2) is the effective area of the electrode and Δ*V* (V) is the working potential. So the specific capacitance decreases with the increase of scan rate.

The specific capacitance of Ag@Ni(OH)₂ electrode can be obtained by the following equation:

$$C_s = \frac{I \times \Delta t}{S\Delta V}$$

where *Cs* (F cm^{-2}) is the specific capacitance, *I* (A) is the charge–discharge current, Δ*t* (s) is the discharging time, *S* (cm^2) is the effective area of the electrode and Δ*V* (V) represents the potential drop during discharge.

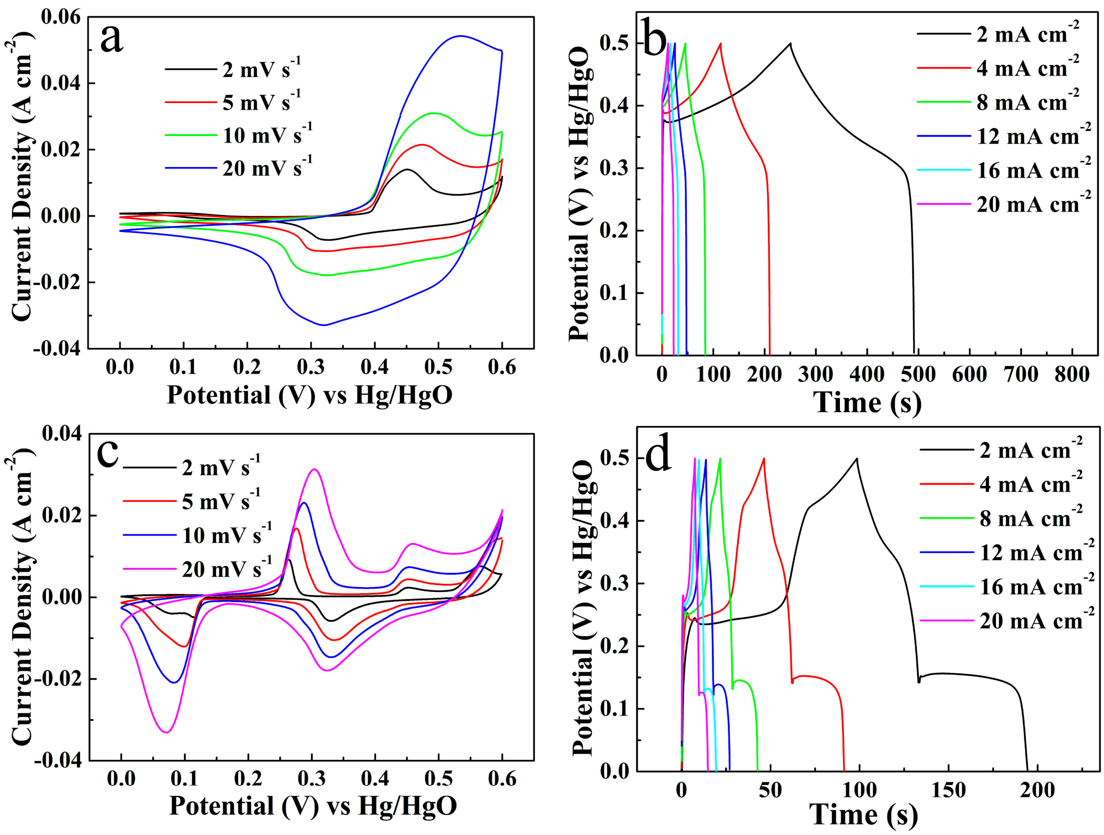

Figure S2. (**a**,**c**) The CV curves and (**b**,**d**) GCD curves of $Ni(OH)_2$ and the Ag electrode, respectively.

Table S1. The specific capacitance versus current density of the three electrodes.

Electrode C_s **(F cm⁻²)**	**2 mA**	**4 mA**	**8 mA**	**12 mA**	**16 mA**	**20 mA**
Ag@$Ni(OH)_2$	1.864	1.395	1.098	0.946	0.838	0.760
$Ni(OH)_2$	0.962	0.766	0.619	0.540	0.480	0.436
Ag	0.388	0.359	0.336	0.319	0.310	0.296

The average equivalent series resistance (R_{ESR}) are derived from the equation:

$$R_{ESR} = \frac{V_{\text{drop}}}{2I}$$

where, V_{drop} (V) is the abrupt voltage drop at the beginning of the discharging curve and I (A) is the corresponding current.

Table S2. The R_{ESR} and voltage drop versus current density of the Ag@$Ni(OH)_2$ electrode.

I **(mA)**	**2 mA**	**4 mA**	**8 mA**	**12 mA**	**16 mA**	**20 mA**
V_{drop} **(V)**	0.0043	0.0081	0.0156	0.0230	0.0305	0.0380
R_{ESR} **(Ω cm⁻²)**	1.075	1.015	0.975	0.958	0.953	0.950
Average R_{ESR} **(Ω cm⁻²)**			0.988			

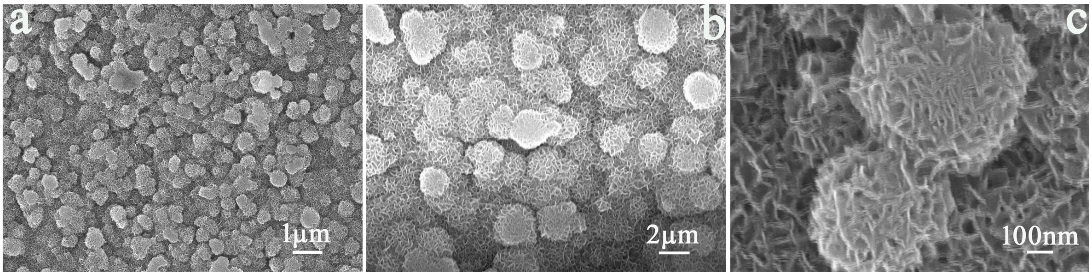

Figure S3. FE-SEM images of the $Ag@Ni(OH)_2$ composite at different magnifications after 3000 cycles.