Supporting Information

Towards three-dimensional hierarchical ZnO nanofiber@$Ni(OH)_2$ nanoflake core-shell heterostructures for high-performance asymmetric supercapacitors

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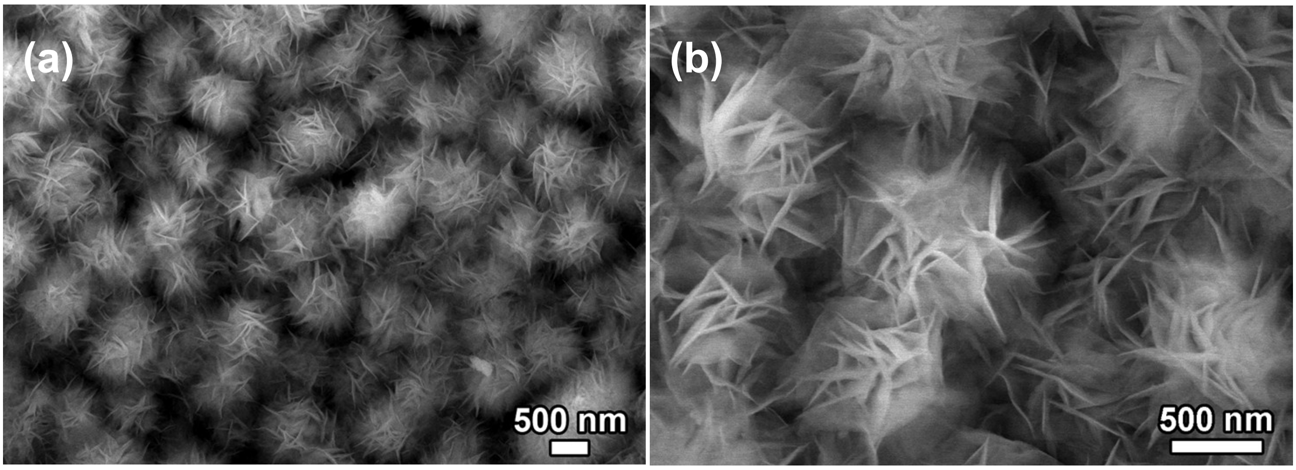

Fig. S1 (a and b) SEM images of pure $Ni(OH)_2$ prepared without the presence of ZnO nanofibers.

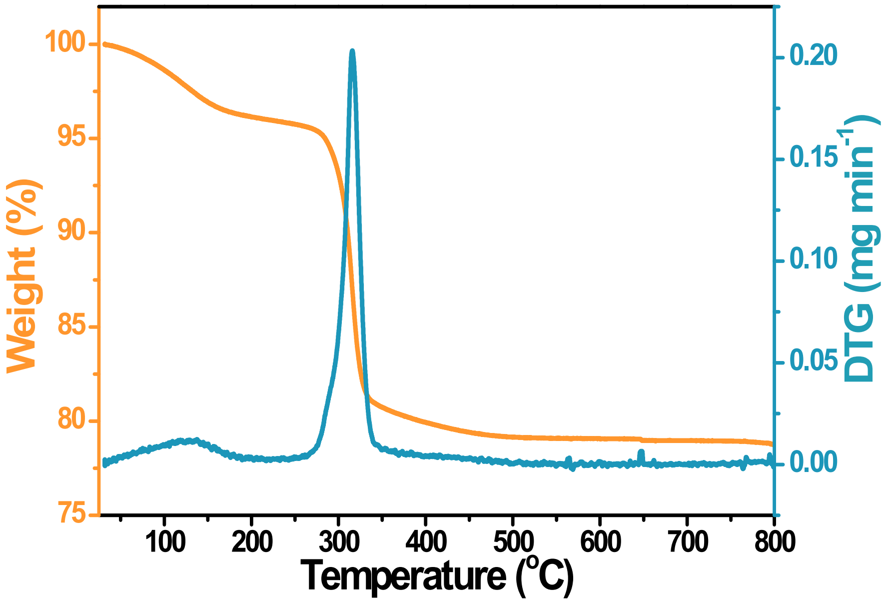

Fig. S2 TGA and DTG profiles of the ZnO@$Ni(OH)_2$ hybrid.

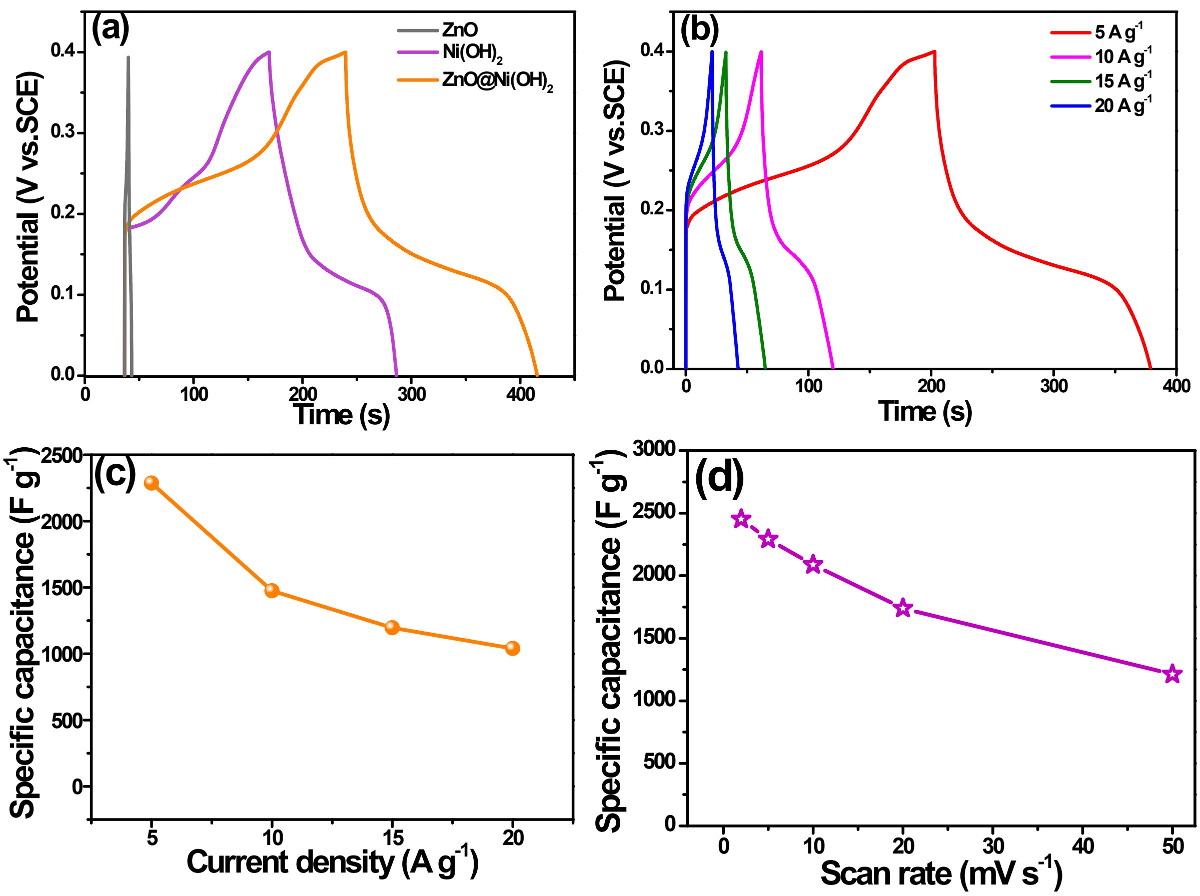

Fig. S3 (a) Galvanostatic charge-discharge curves of ZnO, $Ni(OH)_2$ and ZnO@$Ni(OH)_2$ hybrid at the current density of 5 A g^{-1}. (b) Galvanostatic charge-discharge curves of the ZnO@$Ni(OH)_2$ hybrid at various current densities. (c) Average specific capacitances of the as-prepared electrodes at various current density. (d) Average specific capacitances estimated based on the mass of $Ni(OH)_2$ in the hybrid.

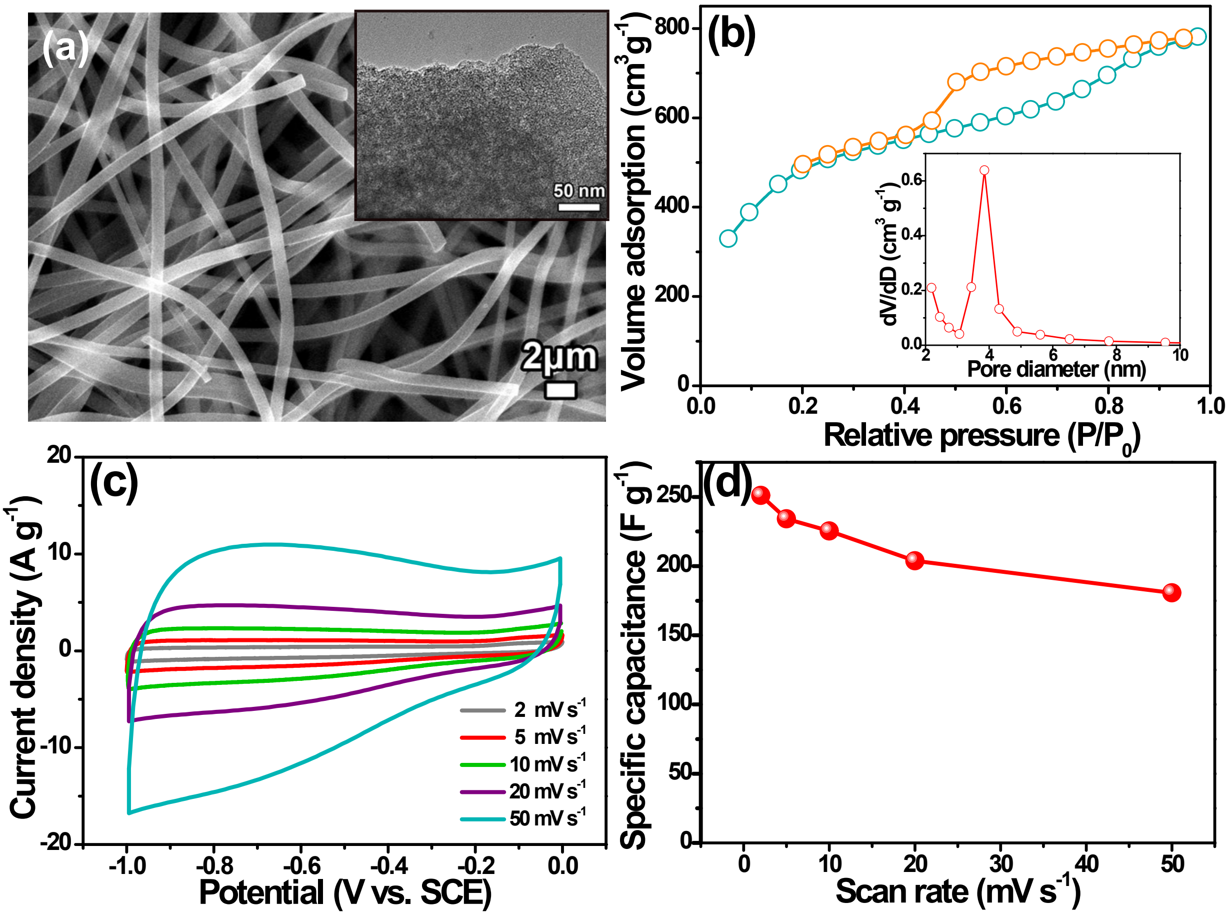

Fig. S4 (a) SEM and TEM images of representative PCNFs. (b) Nitrogen adsorption/desorption isotherm and pore size distribution curve for PCNFs. (c) CV curves and (d) specific capacitances of the PCNF electrode at varous scan rates.

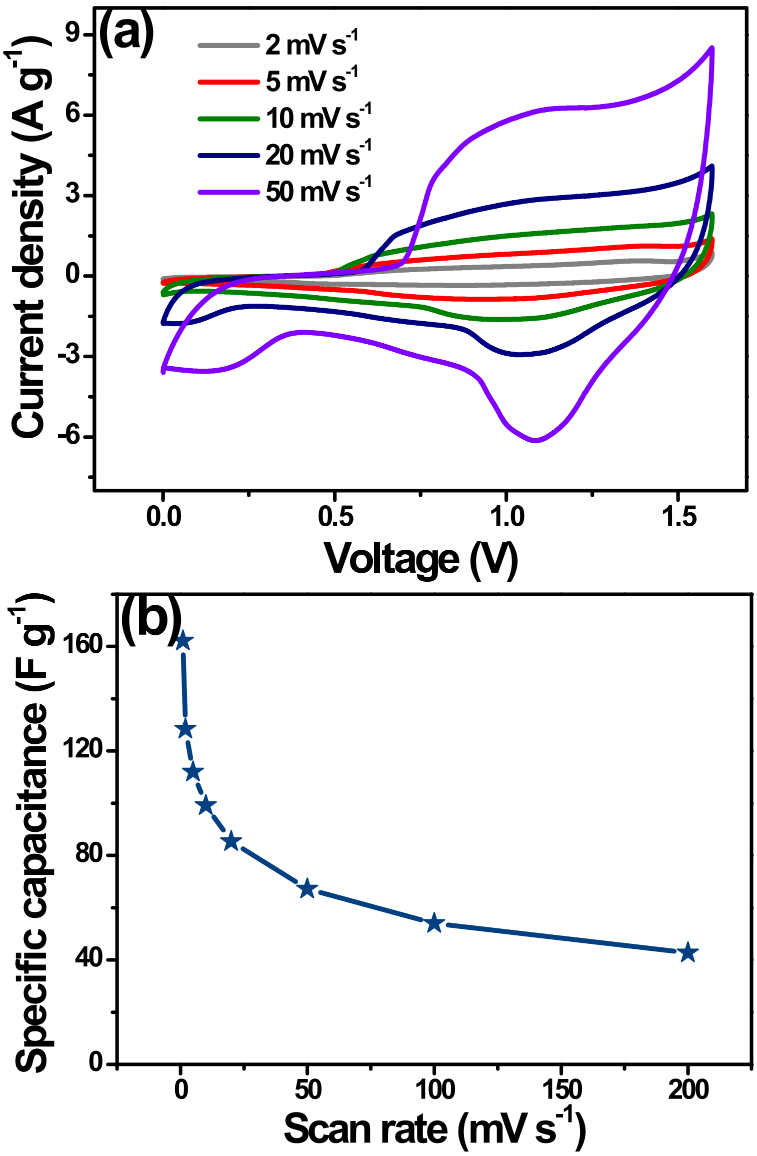

Fig. S5 (a) CV curves and (b) specific capacitance of the fabricated ZnO@Ni$(OH)_2$//PCNF asymmetric supercapacitor at various scan rates.

Table S1. Comparison of the capacitance and rate capability of the ZnO@$Ni(OH)_2$ with previously reported $Ni(OH)_2$ materials.

Materials	Capacitance (F g^{-1})	Rate capability (%)	Ref.
α-$Ni(OH)_2$	805 (5 mV s^{-1})	33 (40 mV s^{-1})	1
$Ni(OH)_2$/GO	1355 (2.8 A g^{-1})	71 (45.7 A g^{-1})	2
$Ni(OH)_2$/MWCNT	1487 (5 mV s^{-1})	67 (100 mV s^{-1})	3
CNT@$NiCo_2O_4$	1038 (0.5 A g^{-1})	36 (10 A g^{-1})	4
$Ni(OH)_2$-MnO_2	2628 (3 A g^{-1})	50 (20 A g^{-1})	5
MWCNT/amor-$Ni(OH)_2$	3262 (5 mV s^{-1})	71 (100 mV s^{-1})	6
Nickel-cobalt oxide	1227 (5 mA cm^{-2})	26 (50 mA cm^{-2})	7
coin-like $Ni(OH)_2$	1532 (0.2 A g^{-1})	55 (4 A g^{-1})	8
GNS/$Ni(OH)_2$	1954 (5 mV s^{-1})	43 (20 mV s^{-1})	9
ZnO@$Ni(OH)_2$	2218 (2 mV s^{-1})	49 (50 mV s^{-1})	This work

Table S2. Comparison of the electrolyte, voltage range, maximum energy densities, corresponding average power densities and cycling life with some reported nickel hydroxide based asymmetric supercapacitors.

Asymmetric supercapacitor	Electrolyte (mol L^{-1})	Voltage (V)	*E* (Wh kg^{-1})	*P* (W kg^{-1})	Cycle life	Ref.
$Ni(OH)_2$/graphene//RuO_2/graphene	1 M KOH	1.5	48	230	92% (5000)	10
Zn-Co-$Ni(OH)_2$/AC//AC	6 M KOH	1.6	35.7	900	80% (1000)	11
α-$Ni(OH)_2$//AC	2 M KOH	1.6	42.3	110	82% (1000)	12
$Ni(OH)_2$/graphene//graphene	6 M KOH	1.6	77.8	175	94% (3000)	13
$Ni(OH)_2$//CNT-AC	6 M KOH	1.8	50.6	95	83% (3000)	14
Co–Ni/graphene//AC/CNT	2 M KOH	1.4	41	210	–	15
$Ni(OH)_2$/graphene//CNTs	1 M KOH	1.5	58.5	780	86% (30000)	6
Co_3O_4@$Ni(OH)_2$//RGO	6 M KOH	1.6	18.54	1860	86% (1000)	16
$Ni(OH)_2$/MnO_2/RGO//FRGO	1 M KOH	1.6	54	390	75% (2000)	17
Ni-Co oxide//APDC	1 M LiOH	2.0	54	110	96% (5000)	18
$Ni(OH)_2$/UGF//a-MEGO	6 M KOH	1.6	6.9	44000	63% (10000)	19
$Ni(OH)_2$//AC	1 M KOH	1.3	35.7	490	97% (5000)	20
ZnO@$Ni(OH)_2$//PCNFs	6 M KOH	1.6	57.6	129.7	94% (2000)	This work

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