Supplementary Information

From fluorene molecules to ultrathin carbon nanonets with enhanced charge transfer capability for supercapacitors

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Figure captions

Figure S1. (a) TEM image of sheet-like MgO particles. (b, c) Size of MgO particles.

Figure S2. TEM images of (a, b) $UCN^0_{0\text{-}10}$. $UCN^0_{0\text{-}10}$ is made on 2 g naked nano-MgO particles in another corundum boat.

Figure S3. Schematic for the relative position of corundum boats in horizontal tubular furnace.

Figure S4. N_2 adsorption-desorption isotherms of: (a) $UCN_{0\text{-}10}$, (c) $UCN_{3\text{-}0}$. Pore size distribution curves of: (b) $UCN_{0\text{-}10}$, (d) $UCN_{3\text{-}0}$. (e) XRD patterns of $UCN_{0\text{-}10}$ and $UCN_{2\text{-}10}$. (f) Raman spectra of $UCN_{0\text{-}10}$ and $UCN_{2\text{-}10}$.

Figure S5. Carbon nanonets from fluorene molecules via step-by-step self-assembly process.

Figure S6. Schematic for the step-by-step assembly of six-membered fluorene rings.

Figure S7. Schematic for the assembly of UCN from fluorene molecules.

Figure S8. Schematic for the assembly of UCNs from fluorene molecules in nano-MgO-template-confinement space with the aid of KOH.

Figure S9. (a) CV curves of $UCN_{3\text{-}10}$ electrode at 2 and 5 mV s^{-1}. (b) CV curves of $UCN_{0\text{-}10}$ electrode at 2 and 5 mV s^{-1}.

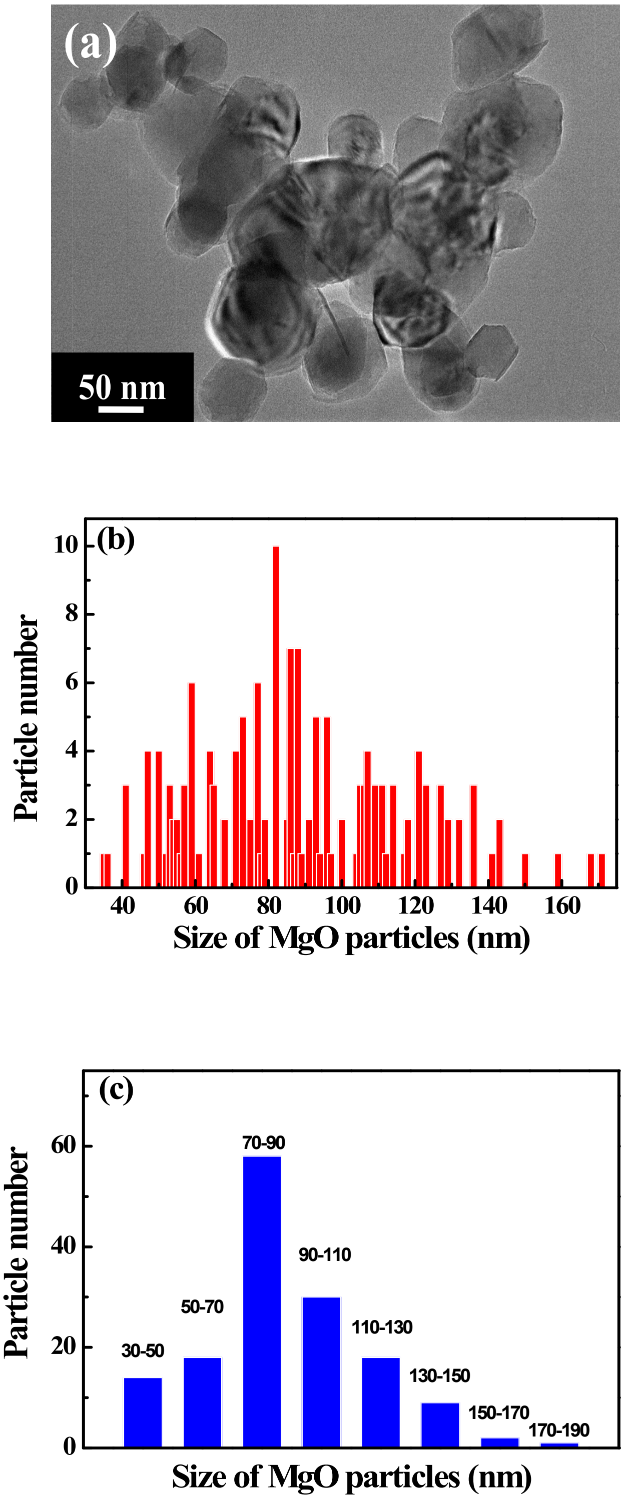
Table captions

Table S1 The pore structure parameters of UCN samples.

Table S2 The XPS results of the UCN samples.

Table S3 Comparison of the specific capacitance of the UCN electrode with that of the hollow nanostructure carbons.

Table S4 Comparison of the performance of the UCN electrode with that of the carbon-based electrode materials.



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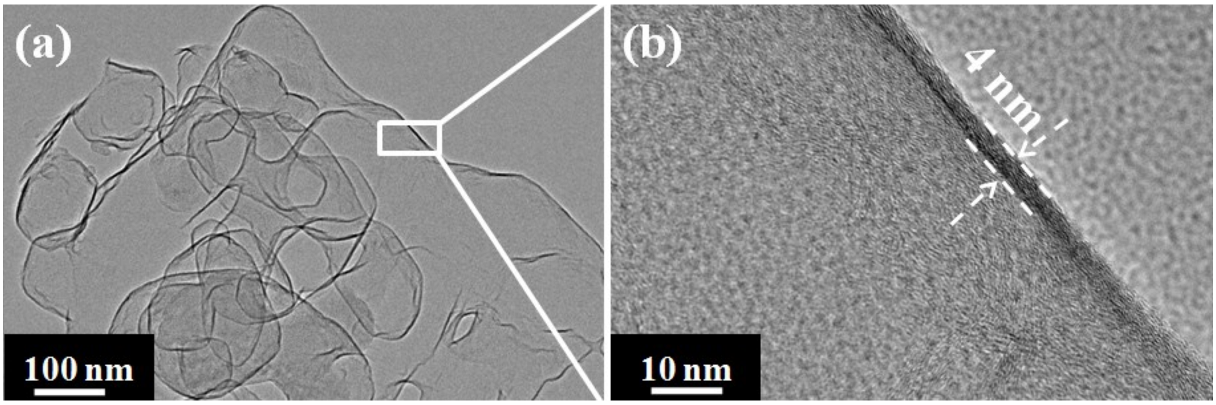
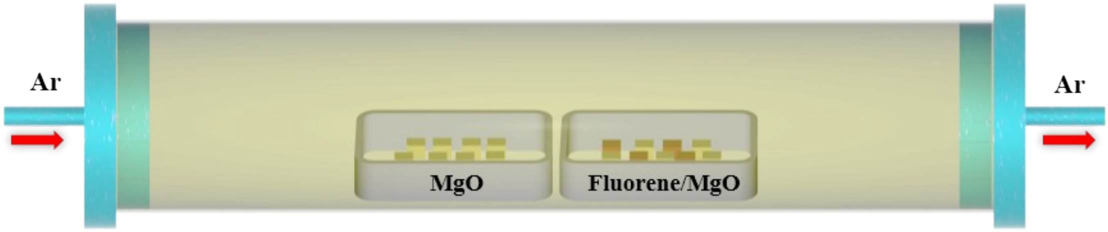


Figure S2. TEM images of (a, b) UCN^0_{0-10}. UCN^0_{0-10} is made on 2 g naked nano-MgO particles in another corundum boat.



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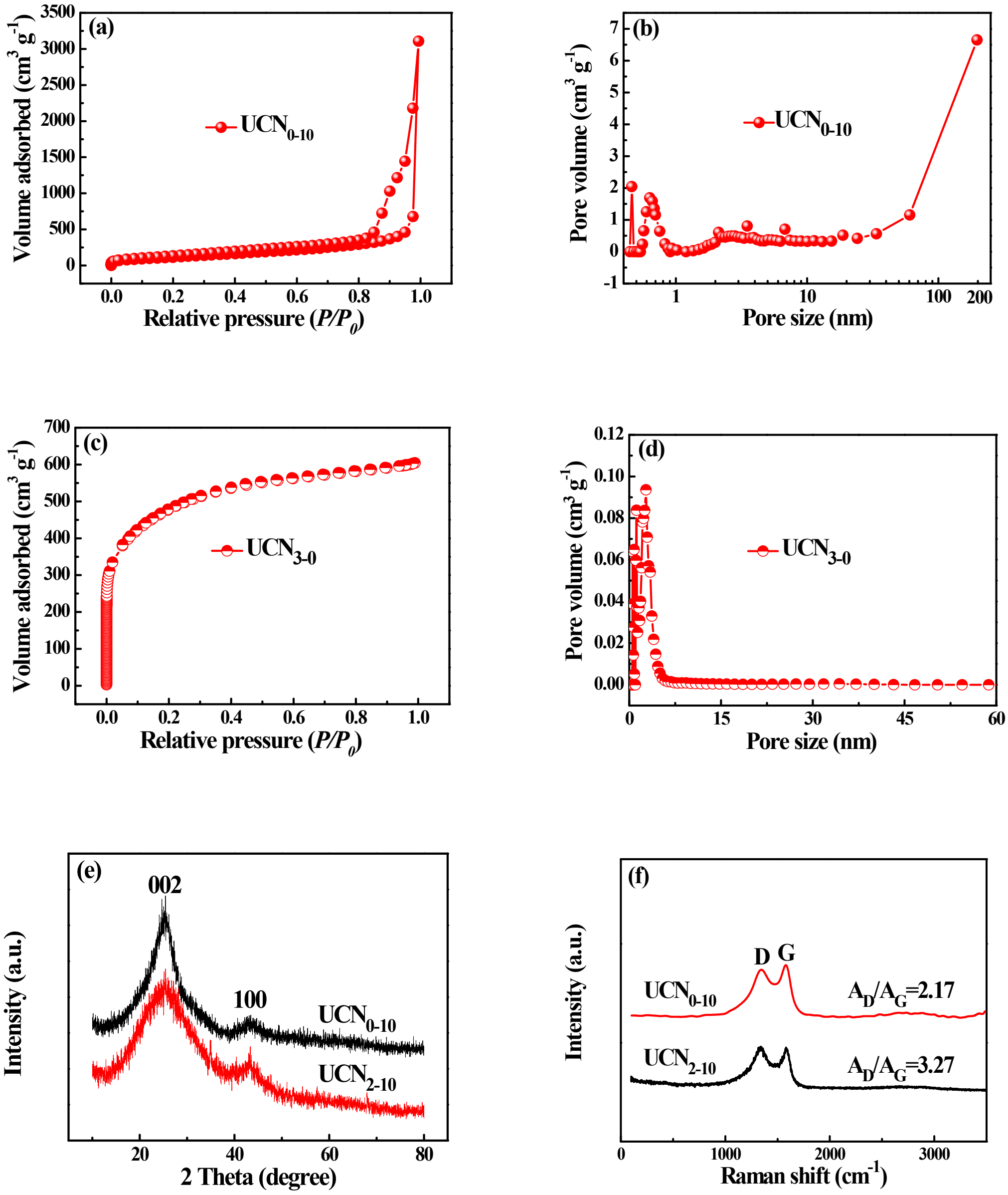

Figure S4. N_2 adsorption-desorption isotherms of: (a) UCN$_{0-10}$, (c) UCN$_{3-0}$. Pore size distribution curves of: (b) UCN$_{0-10}$, (d) UCN$_{3-0}$. (e) XRD patterns of UCN$_{0-10}$ and UCN$_{2-10}$. (f) Raman spectra of UCN$_{0-10}$ and UCN$_{2-10}$.

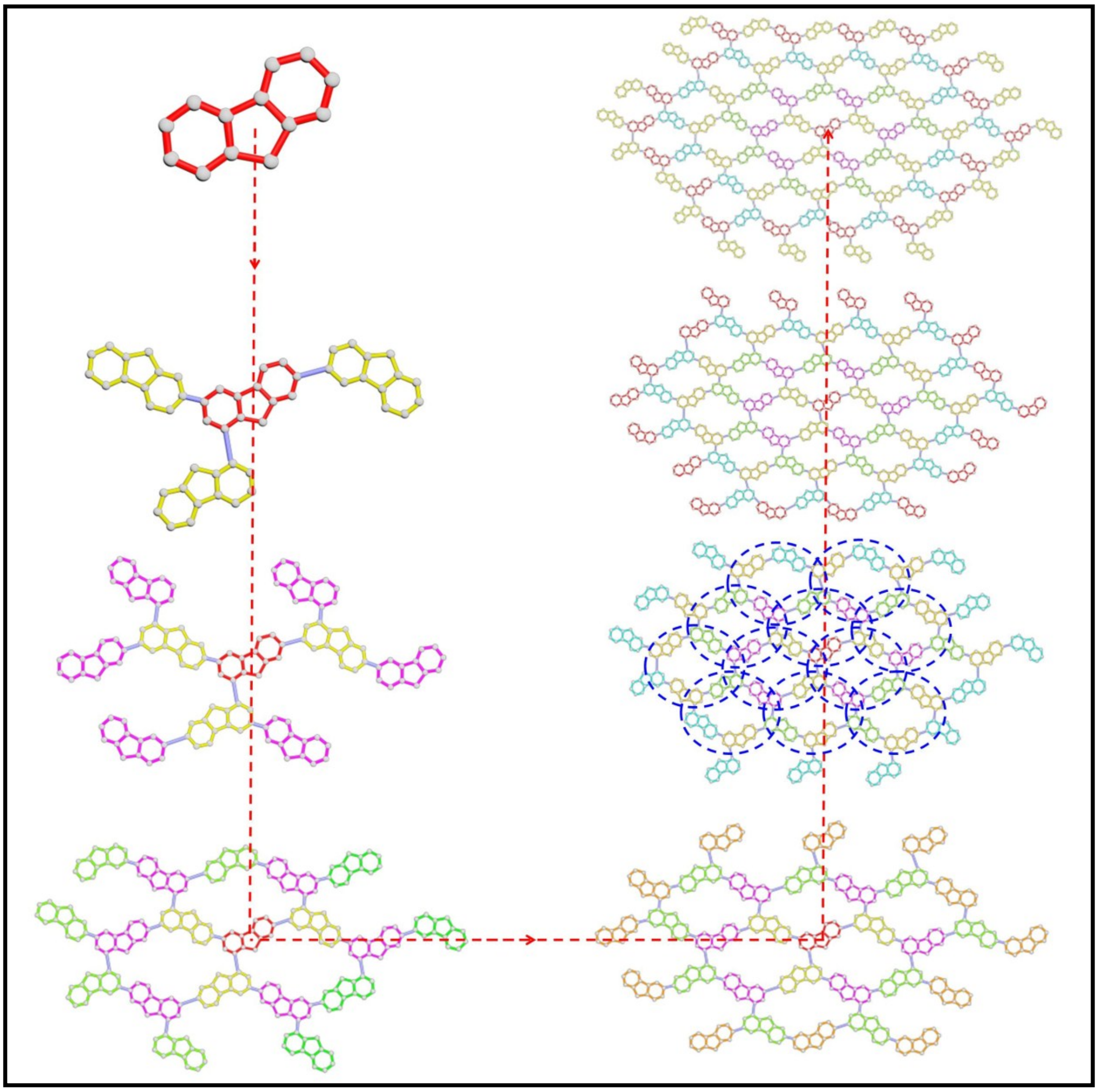

Figure S5. Carbon nanonets from fluorene molecules via step-by-step self-assembly process.

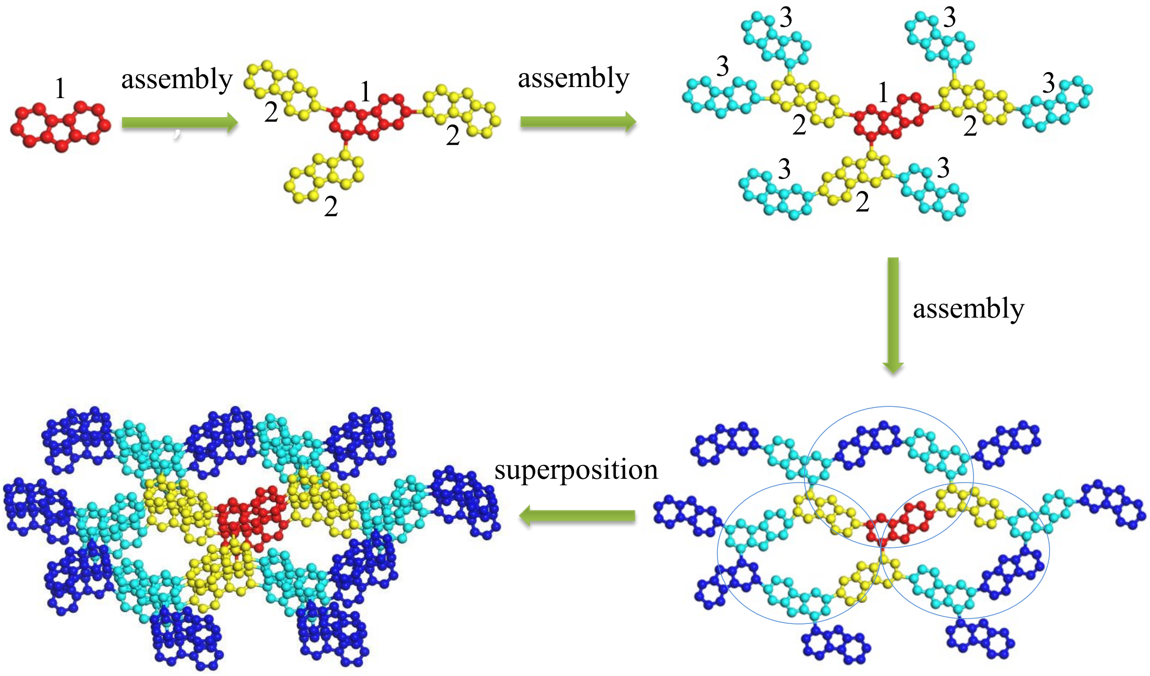

Figure S6. Schematic for the step-by-step assembly of six-membered fluorene rings.

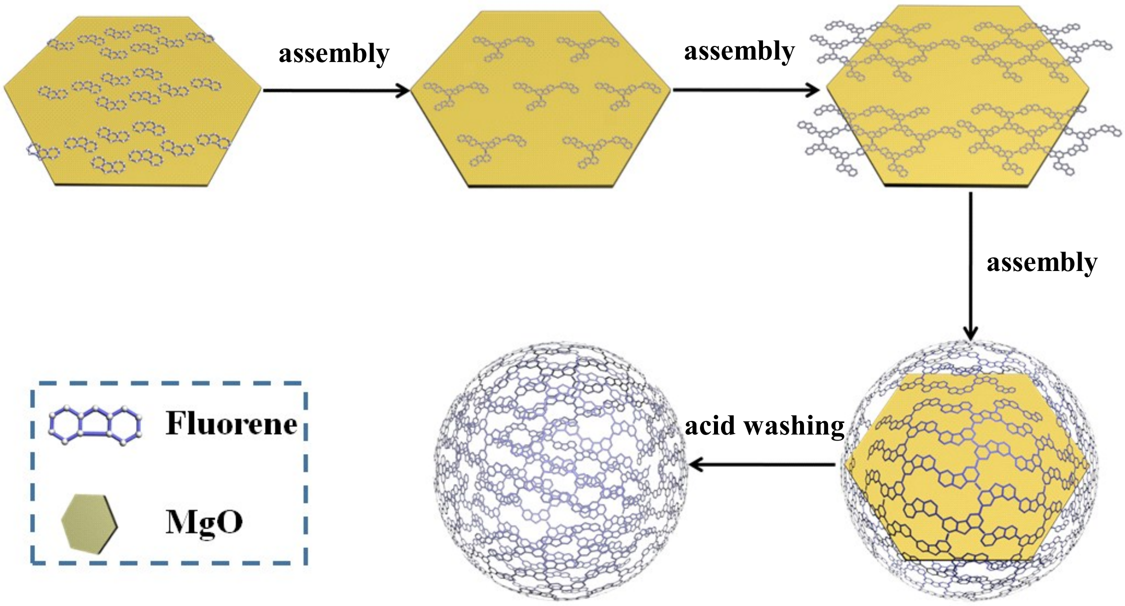

Figure S7. Schematic for the assembly of UCN from fluorene molecules.

Table S1 The pore structure parameters of UCN samples.

Samples	BET surface area (m^2 g^{-1})	Average pore diameter (nm)	Pore volume (cm^3 g^{-1})	Micropore volume (cm^3 g^{-1})
UCN_{0-10}	461	41.7	4.81	0.04
UCN_{2-10}	2107	2.31	1.21	0.88
UCN_{3-10}	2550	2.40	1.57	1.06
UCN_{4-10}	1581	2.24	0.88	0.68
UCN_{3-0}	1701	2.20	0.94	0.25

Table S2 The XPS results of the UCN samples.

Samples	C1s (%)	O1s (%)	O1s		
			C=O (%)	C-O (%)	O-H (%)
UCN_{2-10}	78.63	21.37	5.95	3.91	11.51
UCN_{3-10}	89.52	10.48	5.35	5.13	0
UCN_{4-10}	78.15	21.85	13.31	8.54	0

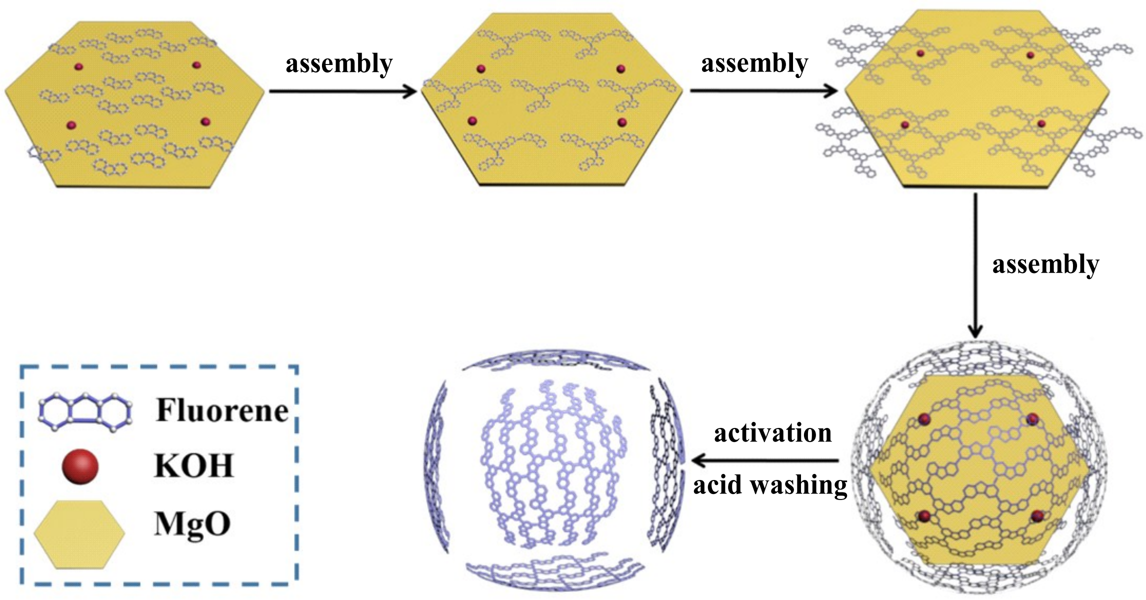

Figure S8. Schematic for the assembly of UCNs from fluorene molecules in nano-MgO-template-confinement space with the aid of KOH.

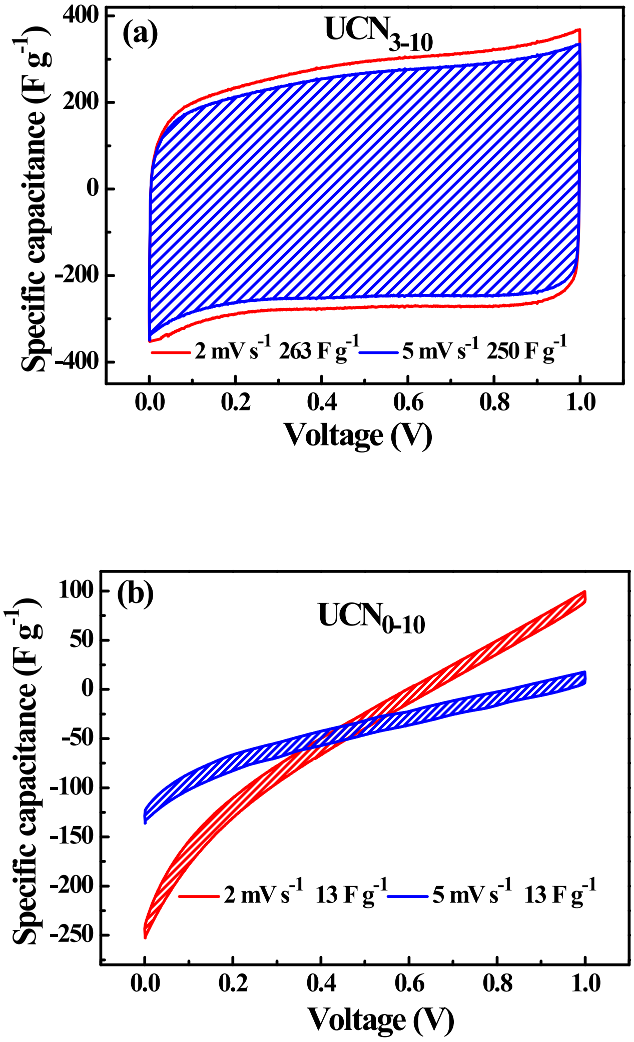

Figure S9. (a) CV curves of UCN_{3-10} electrode at 2 and 5 mV s^{-1}. (b) CV curves of UCN_{0-10} electrode at 2 and 5 mV s^{-1}.

Table S3 Comparison of the specific capacitance of the UCN electrode with that of the hollow nanostructure carbons.

Materials	Electrolyte	Current density (A g^{-1})	Specific capacitance (F g^{-1})	Ref.
BFC	6 M KOH	1.0	200	1
CCNC1	6 M KOH	0.1	205	2
SRPC-4K-900	6 M KOH	0.5	276	3
HP-CF	6 M KOH	0.5	238	4
NPC-m	6 M KOH	0.5	301	5
HPCNC-700-a	6 M KOH	1.0	288	6
HPCNFs-N	6 M KOH	1.0	307	7
h-CNS900	6 M KOH	0.1	272	8
UCN_{3-10}	**6 M KOH**	**0.05** **1.0**	**313** **282**	**This work**

Table S4 Comparison of the performance of the UCN electrode with that of the carbon-based electrode materials.

Materials	S_{BET} (m^2 g^{-1})	Electrolyte	Current density (A g^{-1})	C_g (F g^{-1})	Ref.
a-CBP	1326	6 M KOH	2 mV s^{-1}	296	9
FPGF-200	7	6 M KOH	0.5	388	10
N-ACN$_{10}$	1630	6 M KOH	2 mV s^{-1}	331	11
TRGN	–	6 M KOH	2 mV s^{-1}	442.8	12
a-PNC-10	434	6 M KOH	2 mV s^{-1}	369	13
S-3DCN	575	6 M KOH	1.0	395	14
GSI/Ni	–	6 M KOH	0.2	236	15
WPCNS	1136	6 M KOH	0.05	286	16
UCN$_{3\text{-}10}$	**2550**	**6 M KOH**	**0.05** **1.0**	**313** **282**	**This work**

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