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Supporting Information

Tellurium/nitrogen-doped mesoporous carbon composite material as supercapacitor electrode with outstanding cyclic stability

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Characterization. Thermogravimetric analysis (TGA: N-1000 Instrument) was used to

analyze the mass loss during the stabilization and carbonization process. Nitrogen adsorption–desorption isotherms were obtained at -196°C using a Micromeritics ASAP 2020. XRD patterns of the samples were obtained using a Rigaku SmartLab diffractometer with Cu Ka radiation operated at 40 kV and 30 mA. Raman spectra were obtained with a confocal Raman spectrometry (Jobin Yvon HR800, Horiba) using a 632.8 nm diode laser. The morphology was investigated using a field emission scanning electron microscope (FE-SEM: S-4700 Hitachi, Japan operated at an acceleration voltage of 10 kV) and a high-resolution transmission electron microscope (HRTEM: EM 912 Omega at 120 kV) equipped with an EDS analyzer. The chemical composition and structure were analyzed by XPS conducted on an AXIS-NOVA (Kratos) X-ray photoelectron spectrometer using an Al Ka X-ray source operated at 150 W at a pressure of 2.6×10^{-9} Torr.

Preparation of electrodes. The working electrodes were fabricated by coating a slurry containing 80 wt% active material, 10 wt% Super P and 10 wt% polyvinylidene fluoride (PVDF) onto nickel foam (99.8% pure, MTI Corp.). The amount of active material loaded was about 2–3 mg on the Ni foam and the Ni foam area was 1 cm^2 (the amount of active material: 2–3 mg cm^{-2}).

Electrochemical measurement. The electrochemical tests were conducted in a three electrode cell system on an Iviumstat electrochemical workstation with 6 M KOH as the electrolyte, and platinum and Ag/AgCl (3 M KCl) counter and reference electrodes, respectively. The working electrodes were soaked thoroughly in the electrolyte prior to performing measurements. The CV curves were measured at different scan rates from 10 to 100 mV s^{-1} in a potential range of 0 to -1 V. Galvanostatic charge–discharge (CD) curves were obtained at different current densities from 1 A g^{-1} to 10 A g^{-1}. The specific capacitance C_S (F g^{-1}) of electrode materials was

calculated from the CV curves and GCD curves according to equations (1) and (2), respectively:

$$C_m = \frac{1}{2Vmv}\int idV \qquad (1)$$

$$C_m = \frac{i \times \Delta t}{m\Delta V} \qquad (2)$$

where i is the discharge current, $\int idV$ is the area of the CV curve between 0 and -1.0 V, V is the applied voltage, m is the mass of the active material, v is the scan rate and t is the discharge time.

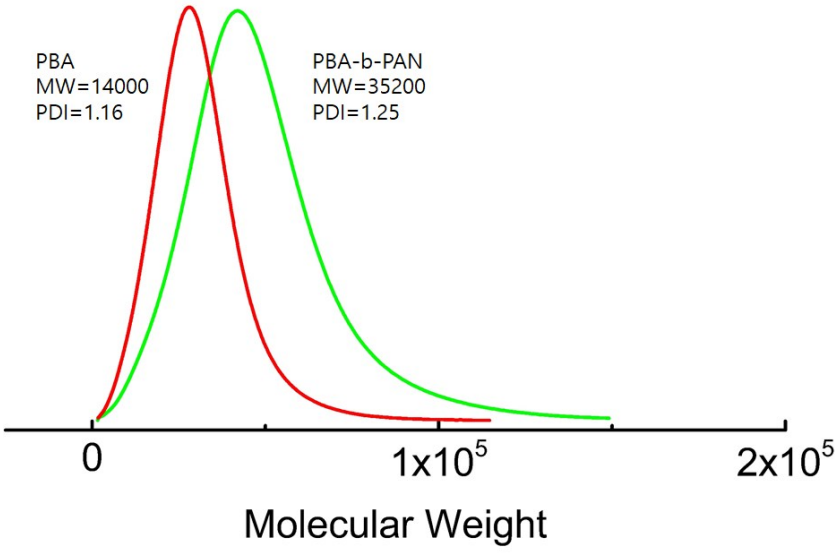

Fig. S1 GPC traces of (a) PBA macroinitiator and PBA-*b*-PAN block copolymer.

Table S1. Partial list of heteroatom- and metal oxide- incorporated carbon materials as per the earlier reported studies.

Electrode Materials	Surface area ($m^2 g^{-1}$)	Pore volume ($cm^3 g^{-1}$)	Heteroatom Content (at. %)	Electrolyte	Specific Capacitance	Cycling life	Ref.[a]
B-doped rGO (reduced graphene oxide)	1102	1.175	B: 12.90 O: 16.40	6 M KOH	336.4 F g^{-1} at 0.1 A g^{-1}	93% after 5,000 cycles	37
N/O-doped activated carbon	3289	3.68	N: 7.35 O: 3.54	2 M KOH	524 F g^{-1} at 0.5 A g^{-1}	88% after 10,000 cycles	38
Passivated P-doped rGO	420	-	O: 4.90 P: 2.85	6 M KOH	108 F g^{-1} at 1 A g^{-1}	70.4% after 2,000 cycles	41
N/O/S-doped porous carbon	2917	2.40	N: 1.60 O: 9.94 S: 3.31	6 M KOH	409 F g^{-1} at 1 A g^{-1}	90.4% after 20,000 cycles	43
N/F/B-doped porous carbon	-	-	B: 0.53 N: 4.00 O: 6.50 F: 0.30	1 M H_2SO_4	350.4 F g^{-1} at 1 A g^{-1}	100% after 10,000 cycles	39
Te-doped rGO	-	-	Te: 1.00	1 M H_2SO_4	460 F g^{-1} at 0.5 A g^{-1}	100% after 2,000 cycles	44
N/Se-doped GO	336.8	1.41	N: 5.89 O: 8.57 Se: 2.13	6 M KOH	302.9 F g^{-1} at 1 A g^{-1}	94.1% after 12,000 cycles	45
Ru doped porous carbon	450.2	0.33	N: 3.19 O: 14.00 Ru: 7.39	6 M KOH	562.8 F g^{-1} at 1 A g^{-1}	100% after 5,000 cycles	46
$CoMo_2S_4$/S-doped 3D graphene	423.7	-	-	6 M KOH	1288.8 F g^{-1} at 1 A g^{-1}	91.8% after 2,000 cycles	47
$CoNiWO_4$/P/S-doped graphene nanosheet	94.4	0.176	O: 20.40 P: 3.09 S: 2.87 Co: 1.83 Ni: 1.81 W: 3.22	6 M KOH	1298.6 F g^{-1} at 0.5 A g^{-1}	> 95.5% after 7,500 cycles	48

[a] All references cited in the manuscript.