Supplementary Information

Zn-doped SnO 2 nano-urchin-enriched 3D carbonaceous framework for supercapacitor application

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Figure S1: XPS data showing the proportion of Zn doping in the nanocomposite ZnSnO₂@G as calculated by CASA XPS software.



Figure S2: HRTEM image depicting the square cross-section of the undoped SnO₂ nanospheres



Figure S3: EDAX spectra (inset: elemental percentage) of ZnSnO₂@G composite.

Electrochemical study in organic electrolyte

The CV analysis of the synthesized nanocomposites were also carried out in organic electrolyte using 1 M NEt₄BF₄-acetonitrile solution as electrolyte and it has been observed that the ZnSnO₂@G composite exhibits a specific capacitance of 443F/g i.e., it has a better electrochemical performance as compared to undoped nanocomposites, which is also observed from the CV analysis in 1(M) aq KCl electrolyte solution. Figures S4-S7 depicted below are the plots of electrochemical study carried out in 1 M NEt₄BF₄-acetonitrile solution.



Figure S4: Cyclic voltammogram of the nanocomposites in 1(M) Acetonitrile at a scan rate 10mV/sec in a potential window (0-1.6V)



Figure S5: GCD plot of the nanocomposites 1(M) Acetonitrile at 1A/g in a potential window (0-1.6)



Figure S6: Bar plot of the specific capacitance (F/g) in 1(M) Acetonitrile at 1A/g in a potential window (0-1.6)



Figure S7: Bar plot showing the power density and Energy Density in 1(M) Acetonitrile at 1A/g in a potential window (0-1.6)



Figure S8: (a) Fitted Nyquist plot of nanocomposite



Figure S8 :(b) Equivalent circuit of the fitted Nyquist plot

Table S1: Fitted value of Equivalent circuit element obtained by the simulation of impedance spectra

Sample	$R_s(\Omega)$	C _{dl}	$R_{ct}(\Omega)$	W	СРЕ	n
SnO ₂	(1.165+0.001004)	2.048e ⁻⁶	6.965	0.01971	0.003059	0.8546
ZnSnO ₂	(1.26+0.001134)	2.516e ⁻⁶	6.038	0.02611	0.00167	0.8919
SnO ₂ @CNT	(1.047+0.02862)	2.455e ⁻⁶	5.945	0.0336	0.003127	0.8417
SnO ₂ @G	(0.01296+0.9528)	2.417e ⁻⁶	4.595	0.03206	0.001882	0.8816
ZnSnO ₂ @CNT	(0.8962 + 0.001099)	2.543e ⁻⁶	4.283	965.2	0.00337	0.837
ZnSnO ₂ @G	(0.4777+0.007728)	1.019e ⁻⁵	1.566	1.961e5	0.004344	0.8384