(Supplementary Information)

Dielectric barrier discharge plasma jet (DBDjet) processed reduced graphene oxide/polypyrrole/chitosan nanocomposite supercapacitors

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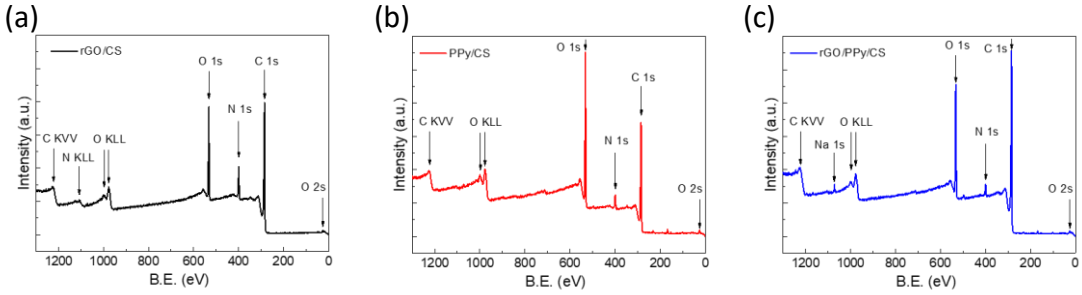

Figure S1. XPS analysis of electrodes for (a) rGO/CS, (b) PPy/CS, and (c) rGO/PPy/CS pastes on carbon cloth.

Table S1. Atomic ratios of C, O, N, Na, S, and Si as calculated from XPS spectra.

	C1s	O1s	N1s	Na1s	S2p	Si2p
rGO/CS	72.9%	17.0%	9.7%	0.4%	0.0%	0.0%
PPy/CS	63.7%	28.3%	5.3%	0.6%	1.1%	1.0%
rGO/PPy/CS	76.1%	18.2%	3.5%	0.7%	0.7%	0.9%

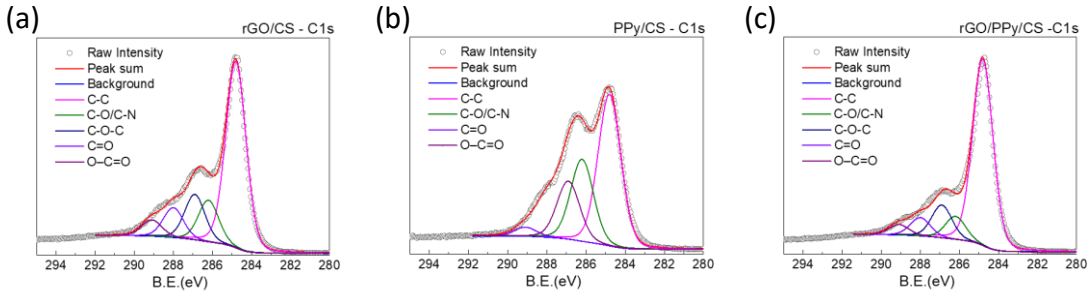

Figure S2. XPS spectra of C1s for (a) rGO/CS, (b) PPy/CS, and (c) rGO/PPy/CS paste on carbon cloth.

Table S2. XPS C1s spectra of electrode with rGO/CS, PPy/CS and rGO/PPy/CS pastes on carbon cloth

Bonding states/ Binding energy(eV)	C-C (284.8)	C-O/C-N (286.2)	C-O-C (286.9)	C=O (288)	O–C=O (289.2)
rGO/CS	58.4%	13.0%	14.2%	9.3%	5.1%
PPy/CS	45.1%	24.4%	17.3%	10.5%	2.7%
rGO/PPy/CS	68.9%	8.5%	12.0%	6.7%	3.9%
Reference	[1]	[1]	[2]	[1]	[3]

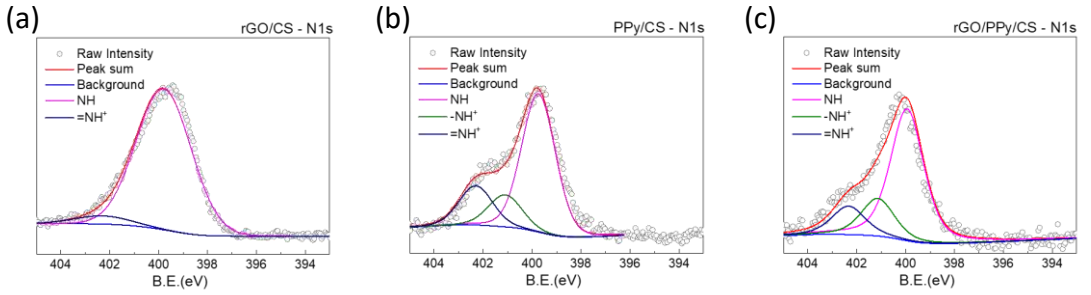

Figure S3. XPS spectra of N1s for (a) rGO/CS, (b) PPy/CS, and (c) rGO/PPy/CS paste on carbon cloth.

Table S3. XPS N1s spectra of electrode with rGO/CS, PPy/CS and rGO/PPy/CS pastes on carbon cloth

Bonding states/ Binding energy (eV)	$–NH–$ (399.8)	$–NH^{+}–$ (401.1)	$=NH^{+}–$ (402.3)
rGO/CS	94.5%	0.0%	5.5%
PPy/CS	66.0%	15.3%	18.7%

rGO/PPy/CS	66.6%	19.0%	14.4%
Reference	[4]	[4]	[4]

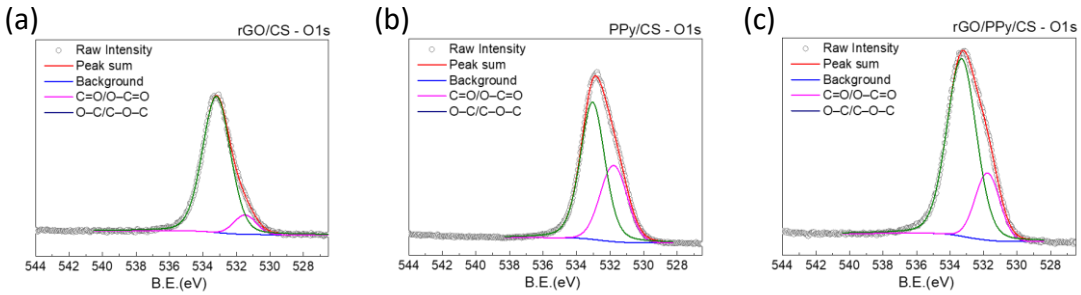

Figure S4. XPS spectra of O1s for (a) rGO/CS, (b) PPy/CS, and (c) rGO/PPy/CS pastes on carbon cloth.

Table S4. XPS O1s spectra of electrode with rGO/CS, PPy/CS, and rGO/PPy/CS pastes on carbon cloth

Bonding states/ Binding energy (eV)	C=O / O–C=O (531.8)	O–C / C–O–C (533.1)
rGO/CS	9.4%	90.6%
PPy/CS	35.1%	64.9%
rGO/PPy/CS	22.4%	77.6%
reference	[4]	[4]

Table S5. Comparison of areal capacitance of SCs with different materials listed in literatures.

Material	Electrolyte	Areal capacitance	Year	Ref.
rGO/PPy/CS	1 M H_2SO_4/PVA gel electrolyte	72.79 mF/cm^2 @ 0.333 mA/cm^2	2021	this study
PEDOT/rGO/CS	1 M H_2SO_4/PVA gel electrolyte	399.33 mF/cm^2 @ 3.333 mA/cm^2	2021	[5]
NNA/PPy	0.5 M Na_2SO_4 aqueous electrolyte	376.90 mF/cm^2 @ 1 mV/s	2015	[6]
rGO/PANI/CS	1 M H_2SO_4/PVA gel electrolyte	195.83 mF/cm^2 @ 0.333 mA/cm^2	2020	[7]
rGO/SnO_2	1 M H_2SO_4/PVA gel electrolyte	34.73 mF/cm^2 @ 0.083 mA/cm^2	2021	[8]

PPy/GO	1 M KCl/filter paper solid-state electrolyte	22.80 mF/cm^2 @ 0.1 mA/cm^2	2014	[9]
rGO	1 M H_2SO_4/PVA gel electrolyte	22.43 mF/cm^2 @ 0.083 mA/cm^2	2019	[10]
e-WO_3/PPy	H_2SO_4/PVA solid-state electrolyte	11.38 mF/cm^2 @ 20 mV/s	2015	[11]
GO/rGO	1 M $TEABF_4$ liquid electrolyte	~2.70 mF/cm^2 @ 20 mV/s	2011	[12]

Note. NNC: Ni nanocones.

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