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Electronic Supporting Information

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Tailoring the Textural Properties of Hierarchical Porous Carbons using Deep Eutectic Solvents

by

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Figure S1 – ^{1}H NMR spectra (using $CDCl_3$ as external reference) of (A) RU00C-DES, (B) RU05C-DES, (C) RU10C-DES and (D) RU20C-DES.

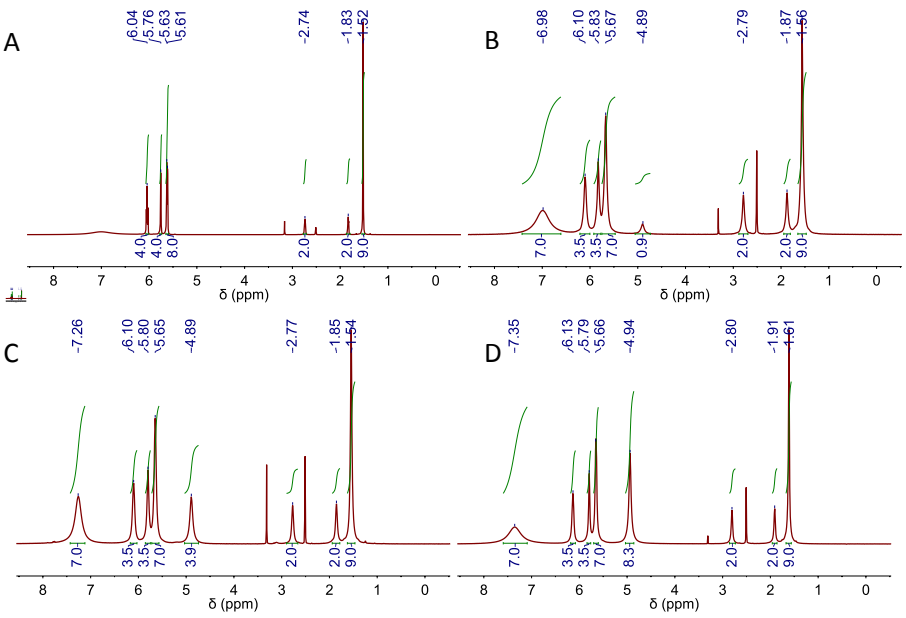

Figure S2 – ^{1}H NMR spectra (using $CDCl_3$ as external reference) of (A) RU00C-DES, (B) RU05C-DES, (C) RU10C-DES and (D) RU20C-DES diluted in water.

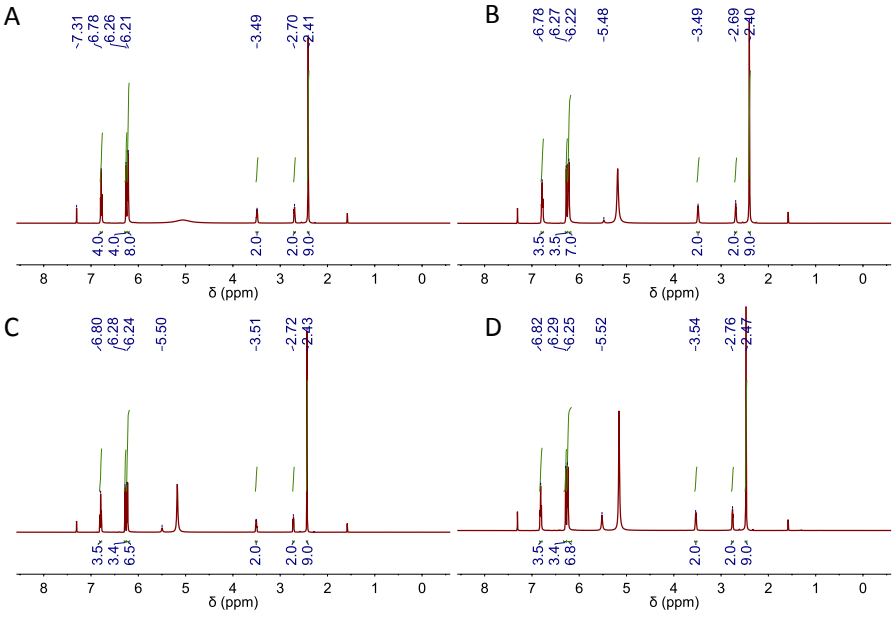

Figure S3 – ^{1}H NMR spectra (using DMSO-d6 as external reference and D_2O as solvent) of the residue obtained after thorough full washing of (A) RU00C-G, (B) RU05C-G, (C) RU10C-G and (D) RU20C-G and subsequent freeze-drying.

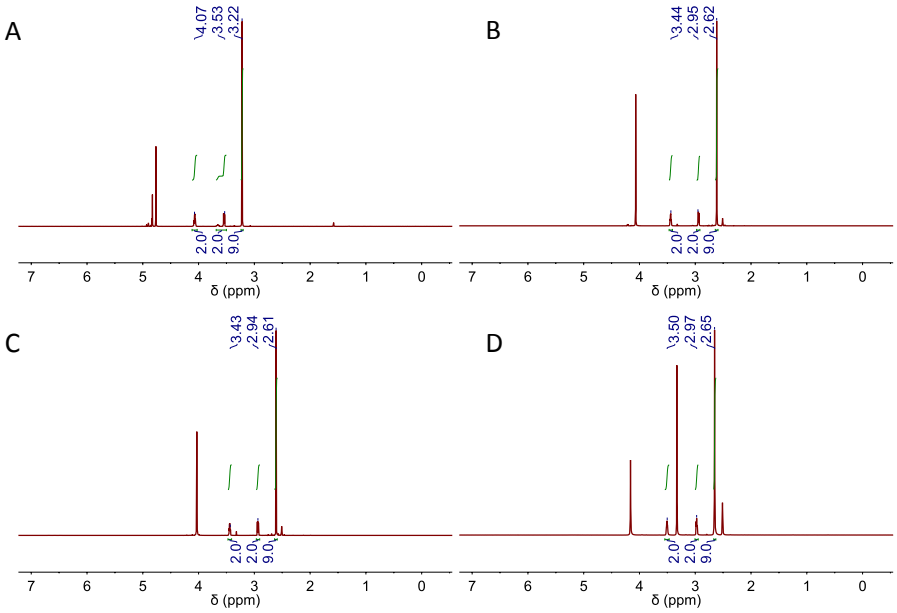

Table S1 - ^{1}H-NMR chemical shifts of RU00C-DES, RU05C-DES, RU10C-DES and RU20C-DES in neat and diluted form. The spectra were recorded using D_2O as solvent and $CDCl_3$ as the external reference. The chemical shifts of resorcinol (15 wt%), choline chloride (12 wt%) and urea (15 wt%) in D_2O solution are also included for comparison. The chemical shifts of the residues obtained after thorough full washing of RU00C-G, RU05C-G, RU10C-G and RU20C-G and subsequent freeze-drying are also included. In this case, the spectra were recorded using D_2O as solvent and DMSO as the external reference.

	δ(ppm)						
Sample	**R**			**C**			**U**
	H at C5	H at C4 &C6	H at C2	H at C2	H at C1	H at CH_3	H at NH_2
R-$CDCl_3$	6.99 (1H)	6.34 (2H)	6.31 (1H)	-	-	-	-
C-$CDCl_3$	-	-	-	4.10 (2H)	3.56 (2H)	3.24 (9H)	-
C-DMSO-d6				3.46 (2H)	2.56 (2H)	2.27 (9H)	
U-$CDCl_3$	-	-	-	-	-	-	5.5 (4H)
RU00C-DES	5.76 (3.5H)	5.63 (7H)	5.61 (3.5H)	2.74 (2H)	1.83 (2H)	1.52 (9H)	-
RU00C-DES diluted	6.78 (3.5H)	6.21 (7H)	6.26 (3.5H)	3.49 (2H)	2.70 (2H)	2.41 (9H)	-
RU00C-G extract	-	-	-	4.07 (2H)	3.53 (2H)	3.22 (9H)	-
RU05C-DES	6.10 (3.5H)	5.67 (7H)	5.83 (3.5H)	2.79 (2H)	1.87 (2H)	1.56 (9H)	4.89 (2H)
RU05C-DES diluted	6.78 (3.5H)	6.27 (7H)	6.22 (3.5H)	3.49 (2H)	2.69 (2H)	2.40 (9H)	5.48 (2H)*
RU05C-G extract	-	-	-	3.44 (2H)	2.95 (2H)	2.62 (9H)	-
RU10C-DES	6.10 (3.5H)	5.80 (7H)	5.65 (3.5H)	2.77 (2H)	1.85 (2H)	1.54 (9H)	4.89 (4H)
RU10C-DES diluted	6.80 (3.5H)	6.24 (7H)	6.28 (3.5H)	3.51 (2H)	2.72 (2H)	2.43 (9H)	5.50 (4H)*
RU10C-G extract	-	-	-	3.43 (2H)	2.94 (2H)	2.61 (9H)	-
RU20C-DES	6.13 (3.5H)	5.79 (7H)	5.66 (3.5H)	2.80 (2H)	1.91 (2H)	1.61 (9H)	4.94 (8H)
RU20C-DES diluted	6.82 (3.5H)	6.25 (7H)	6.29 (3.5H)	3.54 (2H)	2.76 (2H)	2.47 (9H)	5.52 (8H)*
RU20C-G extract	-	-	-	3.50 (2H)	2.97 (2H)	2.65 (9H)	-

Table S2 – Total mass and composition – in wt%, as obtained from elemental chemical analyses – of residues obtained after thorough full washing of polymers with water and subsequent freeze-drying, and the molar ratios of urea versus choline chloride in the residue calculated from the wt% of N and C. The molar ratios of urea versus choline chloride in the original DES are also included for comparison.

Sample	Mass of residue (mg)	Elemental Composition			U/C molar ratio	
		C (wt%)	H (wt%)	N (wt%)	Residue	Original DES
RU05C-G	214.00	40.41	9.33	9.50	0.45	0.5
RU10C-G	228.10	37.79	9.21	9.11	0.72	1
RU20C-G	262.09	35.22	8.91	10.69	1.18	2

Table S3 – Summary of XPS data – binding energies and atomic ratios – found for RU00C-G, RU05C-G, RU10C-G and RU20C-G.

Sample	**C1s**	**N1s**	**O1s**	**O/C at**	**N/C at**	**N_{CHN} wt.%**	**N_{max} wt.%***
RU00C-G	284.8 (52) 285.3 (4) 286.3 (35) 287.7 (9)		532.5	0.352	-	0.84	0
RU05C-G	284.8 (55) 286.2 (34) 287.7 (9) 289.3 (2)	399.4 (57) 400.6 (25) 402.3 (18)	530.8 (25) 532.4 (75)	0.351	0.059	2.93	4.09
RU10C-G	284.8 (56) 286.2 (30) 287.7 (10) 289.2 (4)	399.3 (62) 400.6 (27) 402.1 (11)	530.7 (31) 532.3 (69)	0.345	0.093	4.74	8.05
RU20C-G	284.8 (58) 286.2 (29) 287.7 (10) 289.2 (3)	399.3 (69) 400.6 (24) 402.2 (7)	530.7 (30) 532.3 (70)	0.386	0.174	7.93	15.5

Figure S4 – Pore size distribution obtained by Hg porosimetry of resins (RUC-G, left) and carbons (RUC-C, right). Cumulative volume (line, left axis); derivative volume (symbols, right axis).

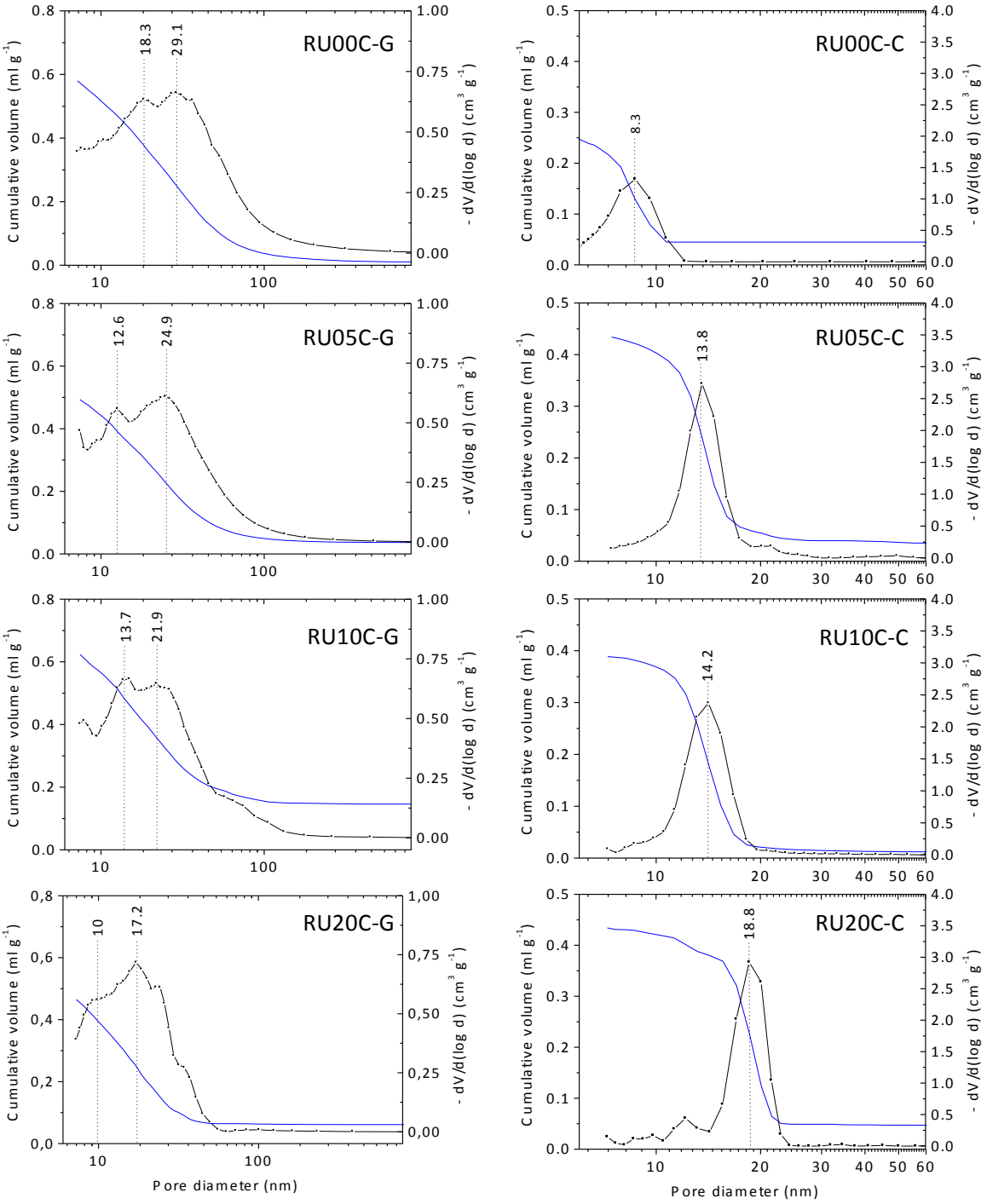

Figure S5 – Charge-discharge curves of RU10C-C (A) and RU20C-C (B) processed in monolithic form, and of RU20C-C processed in form of pellet after grounding and mixing with PVdF – 5wt% – as binder. In this latter case, the charge-discharge curves are depicted at a wider number of current densities (C and D).

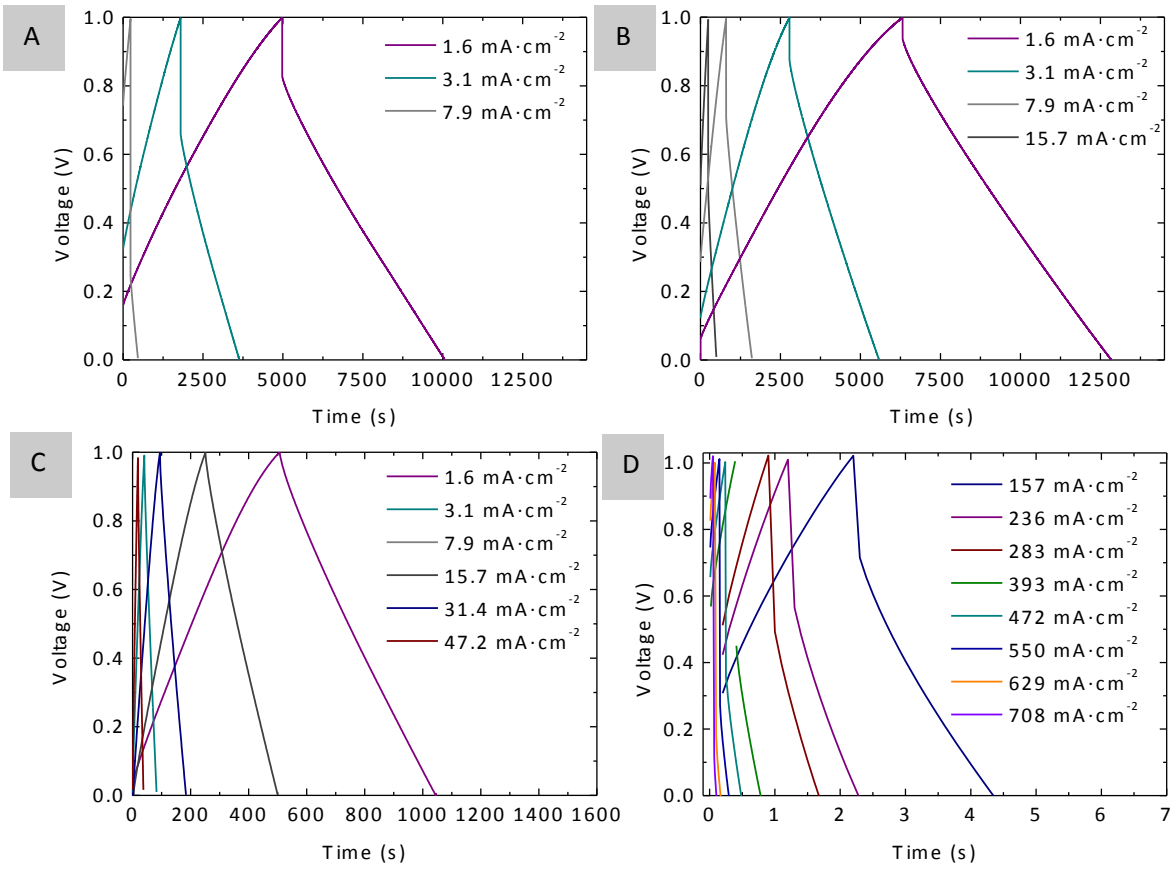

Figure S6 - (a) Nyquist plots obtained for RU10C-C (-o-) and RU20C-C (-▽-) processed in form of pellet after grounding and mixing with PVdF – 5wt% – as binder. (b) Detail of the same plots at high frequencies. (c) Comparison of the Nyquist plot obtained for RU20C-C processed in monolithic form (-▼-) and in form of pellet (-▽-).