Ex-situ nitrogen-doped porous carbons as electrode materials for high performance supercapacitor

Ndeye F. Sylla [a], Ndeye. M. Ndiaye [a], Balla D. Ngom [b], Bridget K. Mutuma [a], Damilola Momodu [a], Mohamed Chaker [c], and Ncholu Manyala [a]*

[a] Department of Physics, Institute of Applied Materials, SARChI Chair in Carbon Technology and Materials, University of Pretoria, Pretoria 0028, South Africa

[b] Laboratoire de Photonique Quantique, d'Energie et de Nano-Fabrication, Faculté des Sciences et Techniques Université Cheikh Anta Diop de Dakar (UCAD) B.P. 5005 Dakar-Fann Dakar, Sénégal

[c] Institut National de la Recherche Scientifique Centre – Énergie Matériaux Télécommunications 1650, Boul. Lionel Boulet, Varennes (Québec) J3X 1S2 Canada

*Corresponding author email: ncholu.manyala@up.ac.za, Tel: + (27)12 420 3549

Fax: + (27)12 420 2516

Supporting information

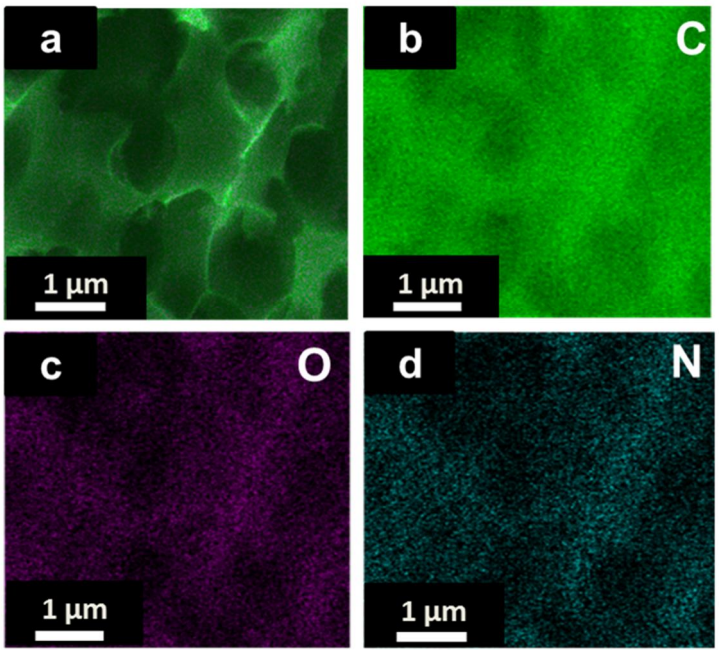

Fig. S1. SEM image of (a) NPAC-1 sample with corresponding EDS elemental mapping of: (b) C, (c) O and (d) N respectively

Table S1. Elemental composition of the PAC samples

Samples	Elemental Composition (at.%)	
	C	O
PAC-0.5	73.3	26.7
PAC-1	81.5	18.5
PAC-2	78.1	21.9

Table S2. Summary of at.% concentration of N-configurations for NPAC samples

Samples	Pyridinic-N	Pyrrolic-N	Graphitic-N	NO_X
NPAC-0.5	37	56.7	1.30	5.0
NPAC-1	40.0	31.0	28.0	1.0
NPAC-2	35.0	29.7	31.5	3.8

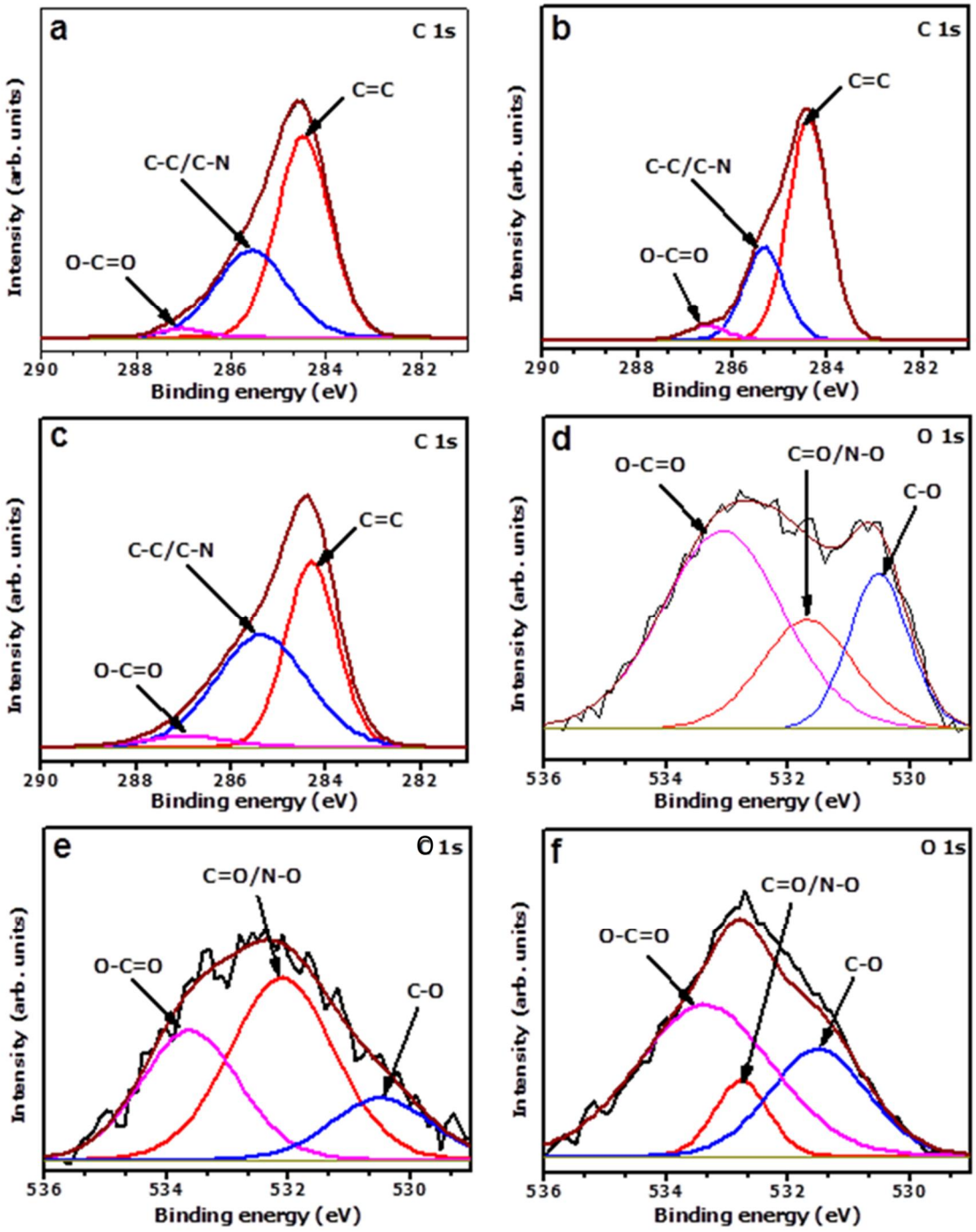

Fig. S2. XPS spectra of deconvoluted C 1s and O 1s peaks of (a, d) NPAC-0.5 (b, e) NPAC-1 (c, f) NPAC-2 materials.

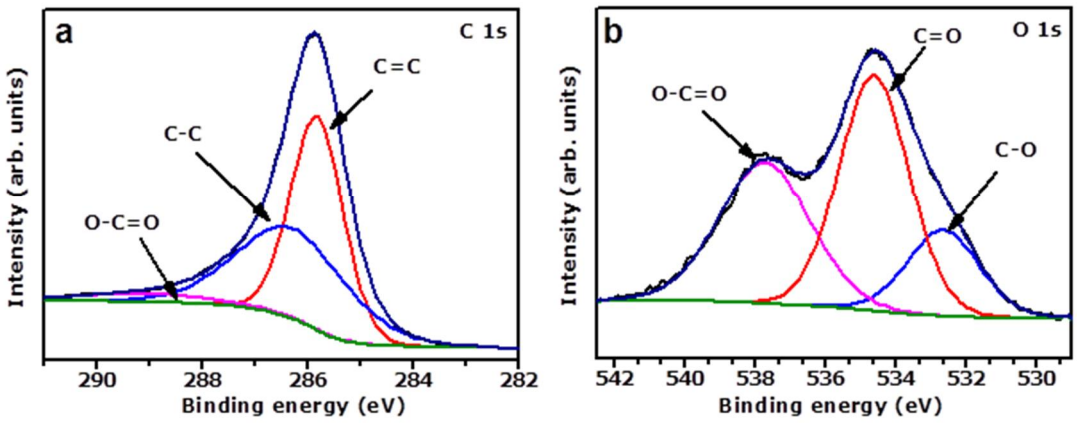

Fig. S3. XPS spectra of deconvoluted of (a) C1s and (b) O 1s peaks of PAC-1 sample

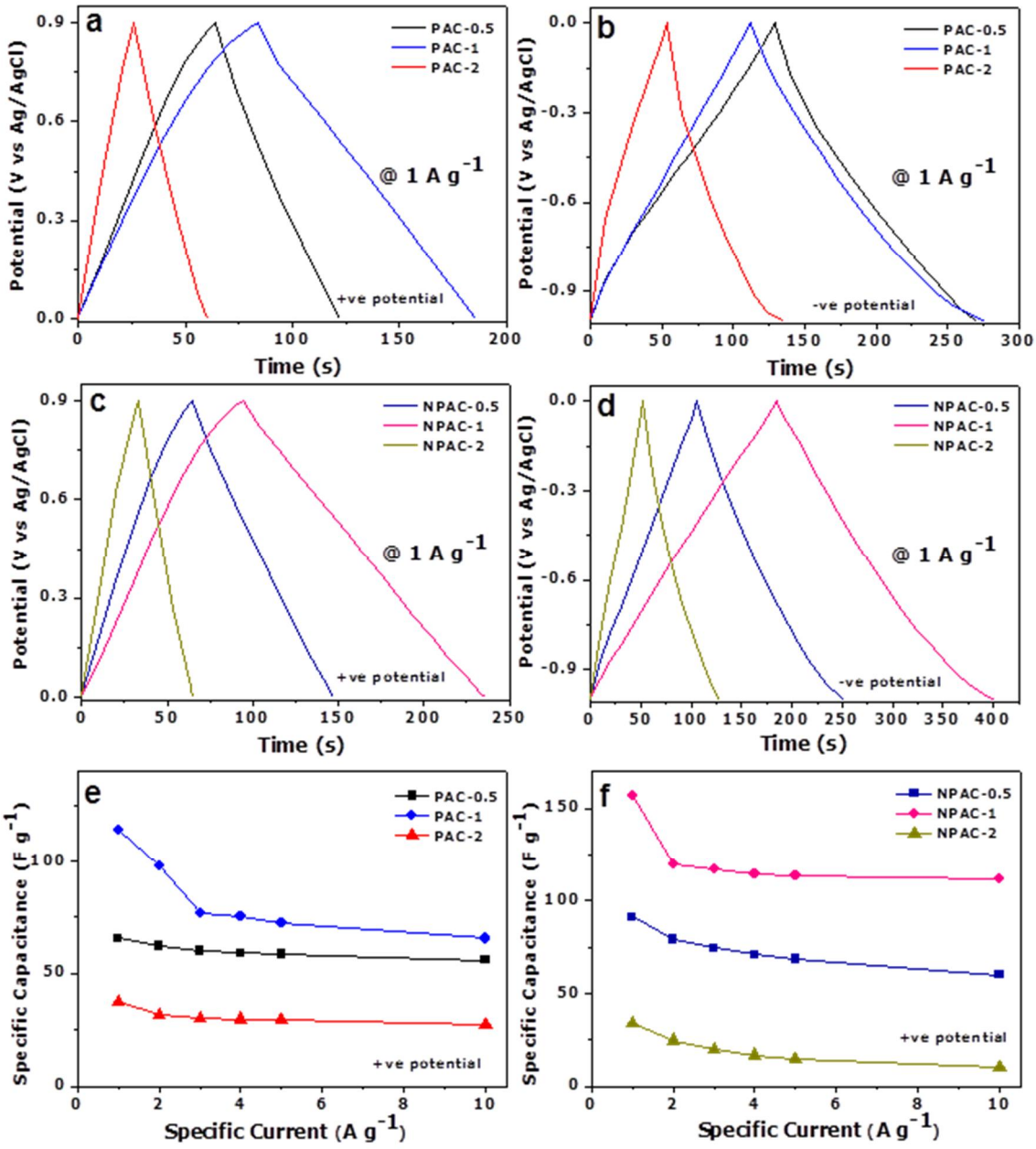

Fig. S4. Galvanostatic charge/discharge curves at 1 A g^{-1} in positive (a, c) and negative (b, d) potential windows (e-f) specific capacitance at various gravimetric current values in positive potential windows of the pristine and N-doped PACs in a three-electrode configuration.

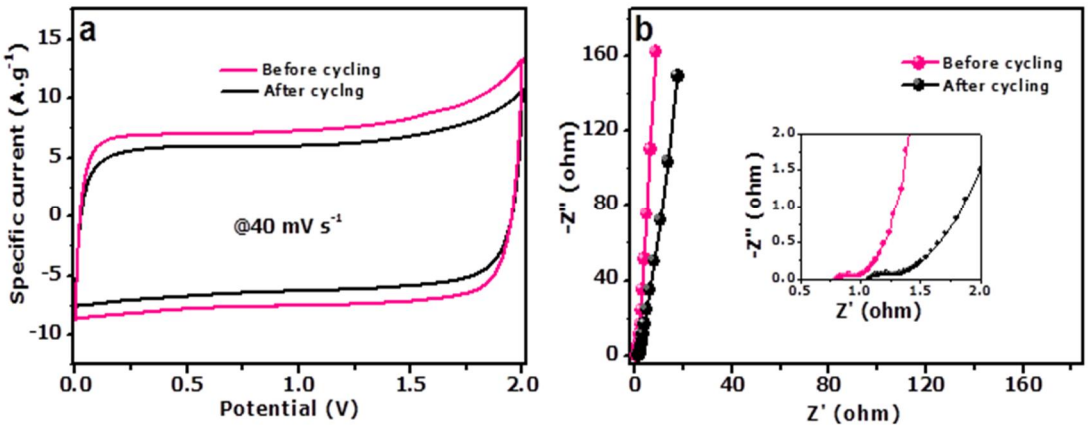

Fig. S5. (a) Cyclic voltammetry at a scan rate of 40 mV s^{-1} and (b) Nyquist plot of NPAC-1//NAPC-1 device before and after 20000 cycles