

## Supporting Information

# 'In-Situ' Preparation of Carbonaceous Conductive Composite Materials Based on PEDOT and Biowaste for Flexible Pseudocapacitor Application

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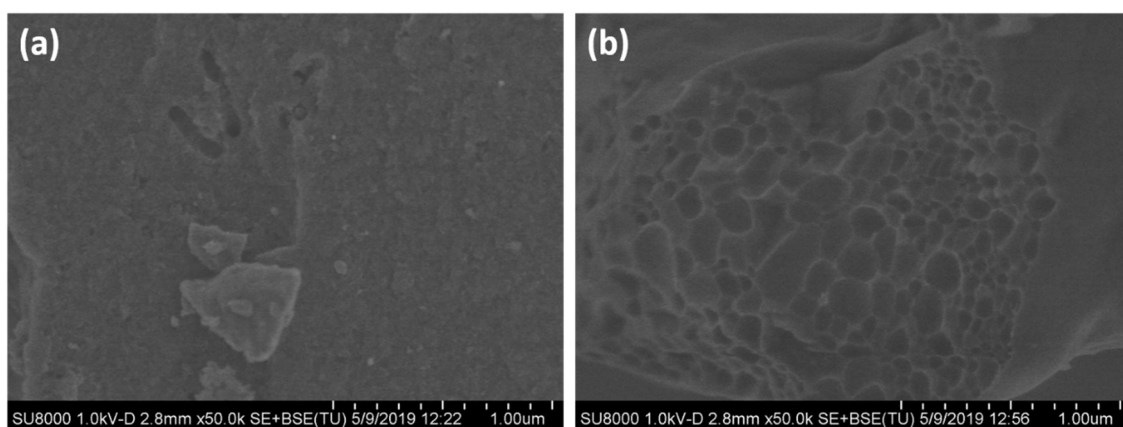
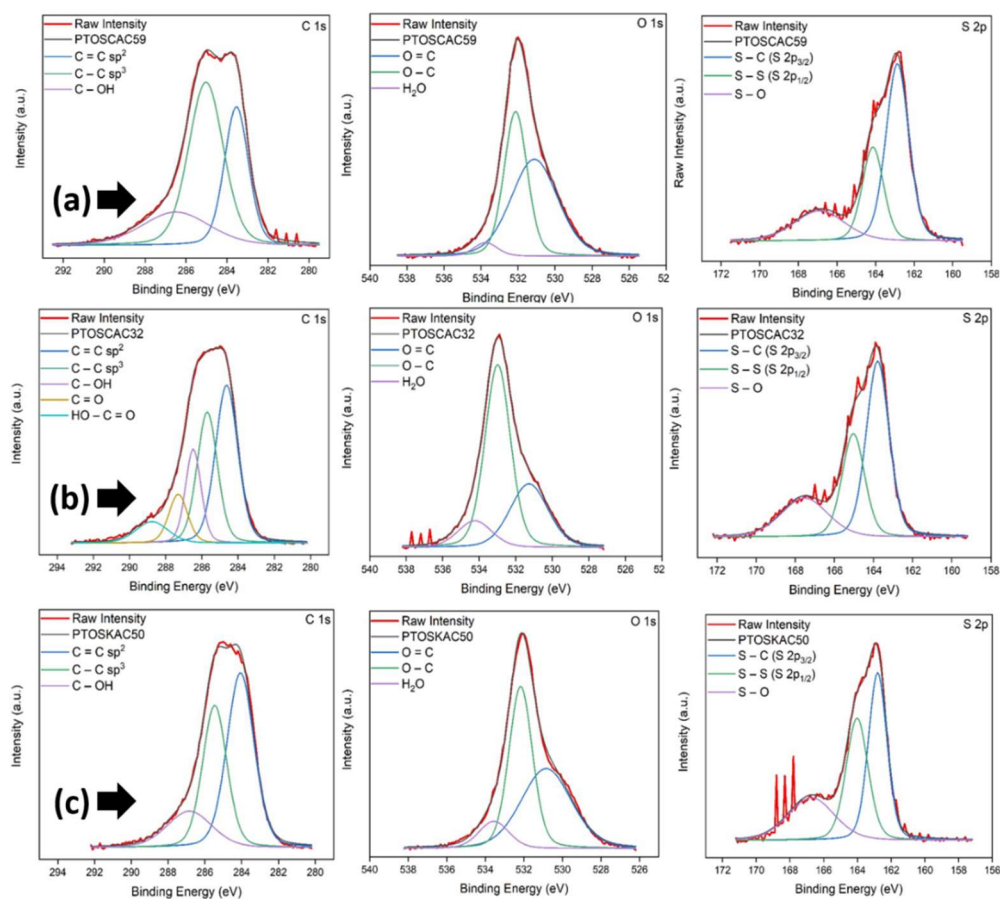


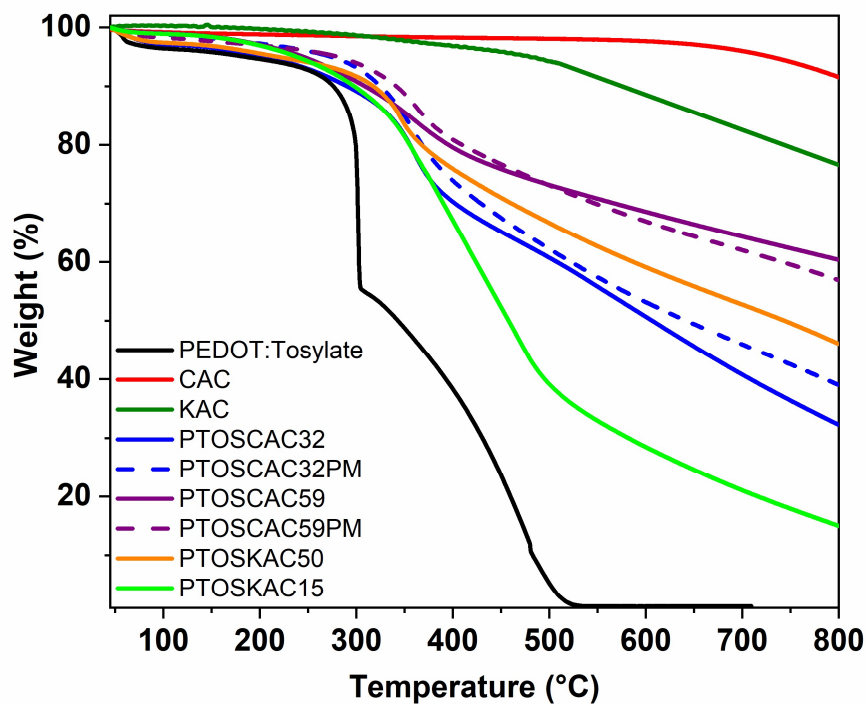
Figure S1. SEM micrographs at 50kx magnification of (a) CAC; and (b) KAC.

Table S1. Subdivision of carbon, oxygen and sulfur signals for XPS spectra.

	C (1s)		O (1s)		S (2p)	
	B.E. (eV)	Area (%)	B.E. (eV)	Area (%)	B.E. (eV)	Area (%)
CAC	289.5	9.8	534.1	41.7	-	-
	286.4	19.5	532.7	51.3	-	-
	285	70.7	-	-	-	-
KAC	289	14.9	-	-	-	-
	287.1	8.3	534	27.1	-	-
	286.1	13.6	532.7	40.5	-	-
	285.1	34.6	531.4	32.4	-	-
	284.6	28.6	-	-	-	-
PTOSCAC50	286.5	19.9	533.8	3.9	167	20
	285	50.4	532.1	41	164.1	26.3
	283.5	29.7	531.1	55.1	162.8	53.7
PTOSCAC30	288.7	8.5	-	-	-	-
	287.3	9	534.2	11.4	167.5	22.2
	286.5	15.8	533	58.4	165	28.6
	285.7	28.8	531.3	30.2	163.8	49.2
	284.6	37	-	-	-	-
PTOSKAC50	286.8	18.9	533.5	9.1	166.7	24.9
	285.4	33.3	532.1	48.3	164	31.3
	284	47.8	530.8	42.6	162.8	43.8
PTOSKAC15	286.4	18.3	533.4	12.6	166.2	17.2
	285.1	47.9	532	65.6	164	32.3
	283.6	33.8	530.2	21.8	162.7	50.5



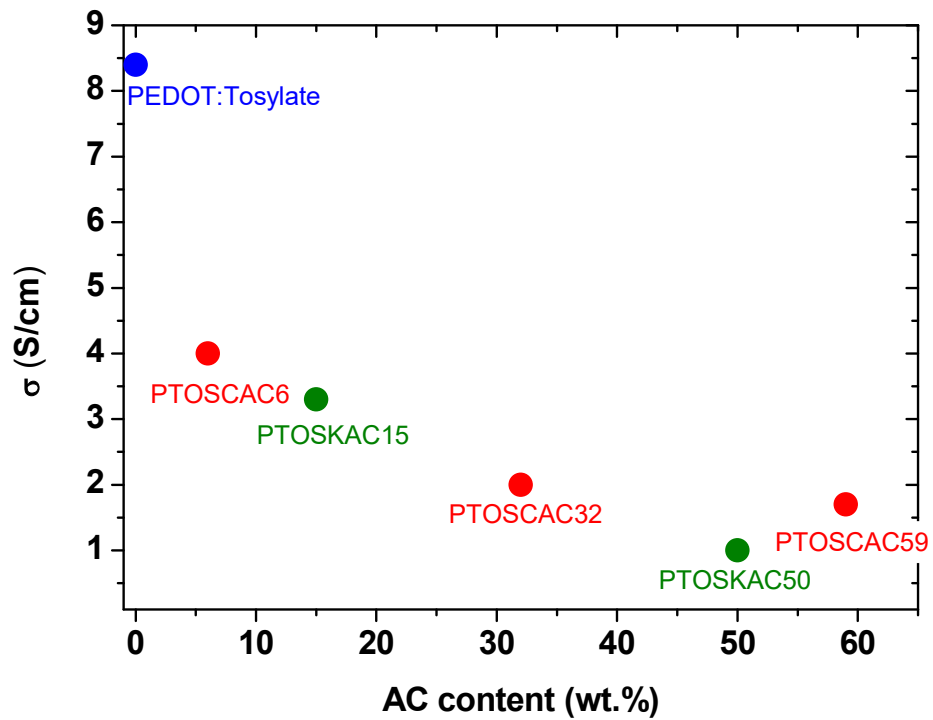
**Figure S2.** C(1s), O(1s) and S(2p) XPS spectra of the following composite materials: (a) PTOSCAC59; (b) PTOSCAC32; (c) PTOSKAC50.



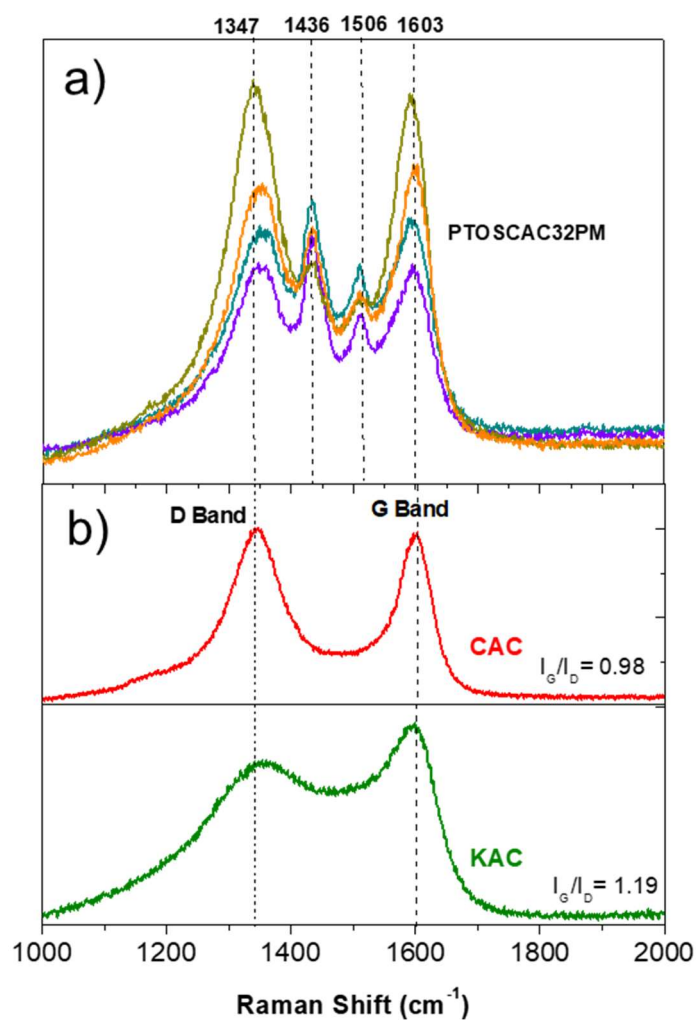
**Figure S3.** TGA curves of PEDOT:Tosylate (black), CAC (red), KAC (green), PTOSCAC32 (blue), PTOSCAC32PM (dash blue), PTOSCAC59 (purple), PTOSCAC59PM (dash purple), PTOSKAC50 (orange), and PTOSKAC15 (green).

**Table S2.**  $T_5$ ,  $T_{50}$  and % residue of materials presented in Figure S2.

Material	$T_5$	$T_{50}$	Residue (wt. %)
PEDOT:Tosylate	186	343	1
CAC	730	-	92
KAC	481	-	77
PTOSCAC32	206	607	32
PTOSCAC32PM	275	642	39
PTOSCAC59	245	-	60
PTOSCAC59PM	282	-	57
PTOSKAC50	219	743	46
PTOSKAC15	238	459	15



**Figure S4.** Dependence of  $\sigma$  respect to the AC content.



**Figure S5.** Raman spectra of PTOSCACPM obtained in different regions of the sample (a) and Raman spectra of CAC and KAC (b).