Supporting information

Assessment of *Hedera helix* response in polluted environment through cross-advanced investigation techniques

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Biofiltration system

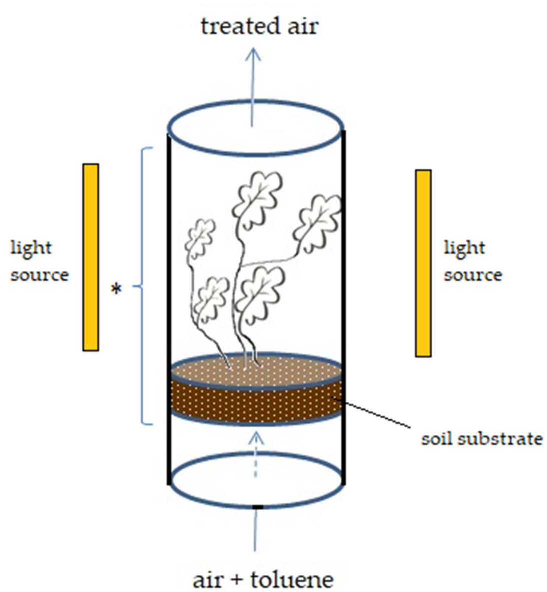


Figure S0. Schematic diagram of the botanical biofiltration system equipped with the investigated plant (*H. helix*) (*working packing volume). Air containing toluene was continuously fed at the bottom of the bioreactor, while the treated air was evacuated at the top, with different removal efficiencies (usually, 40-90%), depending on the inputs (polluted air loading rates). *Leaf samples collected prior and after one month of bioreactor operation have been investigated by using FTIR, LP, SEM, EDX and TG/MS/FTIR techniques, revealing hidden plant-related aspects involved in toluene removal, with important benefits for a better process understanding and further development of suck kind of biotechnology*

ATR-FTIR spectroscopy

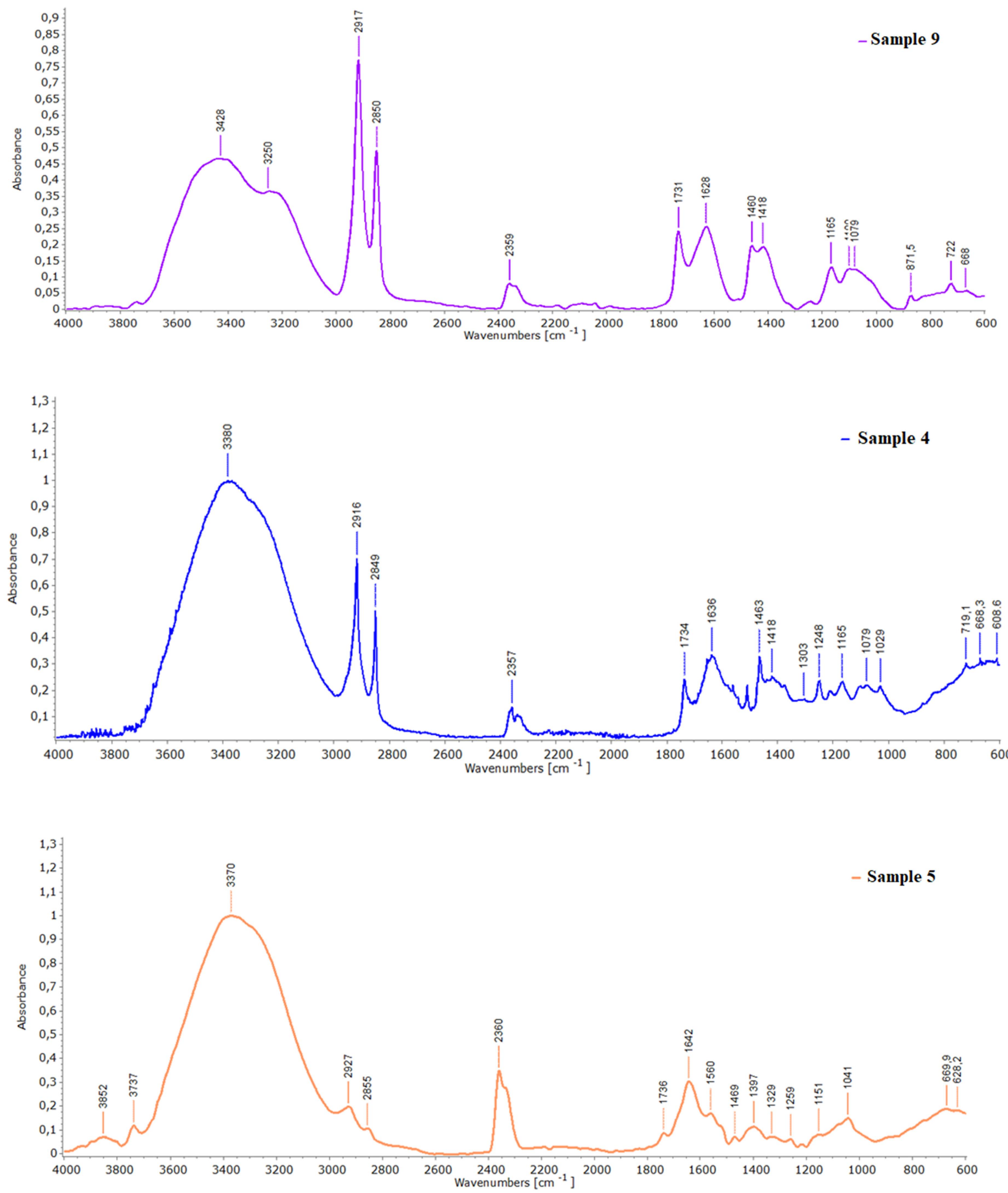
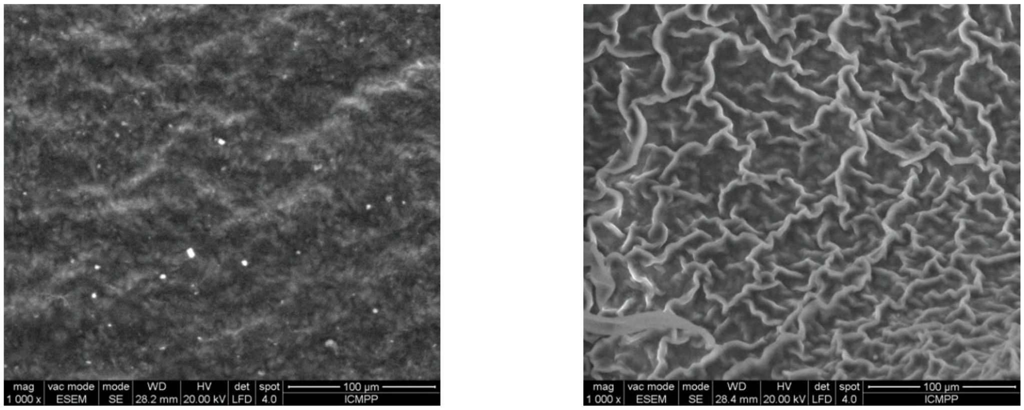


Figure S1. FTIR spectra

Table S1. The characteristic IR absorption bands in (cm^{-1}) of the Hedera Helix samples

Band assignment	Sample 9	Sample 4	Sample 5
	Band frequency/ cm^{-1}		
O–H stretching [1], N–H stretching alkyl or aryl amine [8]	3428, 3250	3380	3370, 3852, 3737
asymmetric CH_2 and CH_3 stretching vibration[2]	2917	2916	2927
symmetric CH_2 stretching vibration [2]	2850	2849	2855
C=O stretching vibration in unconjugated ketone, carbonyl and ester groups [2]	1731	1734	1736
C=O stretching vibration of Ph-(C=O)-groups in lignin [2], [3]	1628	1636	1642
asymmetric CH_3 stretching vibration, CH_2 scissoring vibration lignin and carbohydrates	1460, 1418	1463, 1418	1469
syringyl and condensed guaiacyl [5]	-	-	1329
C–O–C vibration [6]		1303	-
C–O stretching vibration [2]	1260		1259
C–OH stretch and C–H in-plane deformation in syringyl [1]		1248	
asymmetric C–O–C stretching vibration [2]	1165	1165	1151
C-C, C–OH and O–CH_3 stretching cellulose [1], [3], [7]	1079	1079, 1029	1041
C-H deformation in cellulose [3]	871	-	-
aromatic C–H out of plane bending vibration [2], [4]	722	719	-

Scanning Electron Microscopy (SEM)



Sample 4 Sample 5

Figure S2. SEM images for the adaxial surface of samples 4 and 5

Energy dispersive X-ray spectroscopy (EDX)

Table S2. Composition of ivy samples

Sample / Chemical element	Sample 9 Weight/ %	Sample 5 Weight/ %
C K	30.9	47.4
N K	4.1	1.0
O K	28.5	32.2
MgK	0.6	0.7
AlK	1.0	2.9
SiK	11.4	6.4
K K	0.7	1.1
CaK	11.0	1.7
FeL	0.0	0.9
PtM	11.8	5.6

TG/MS/FTIR technique

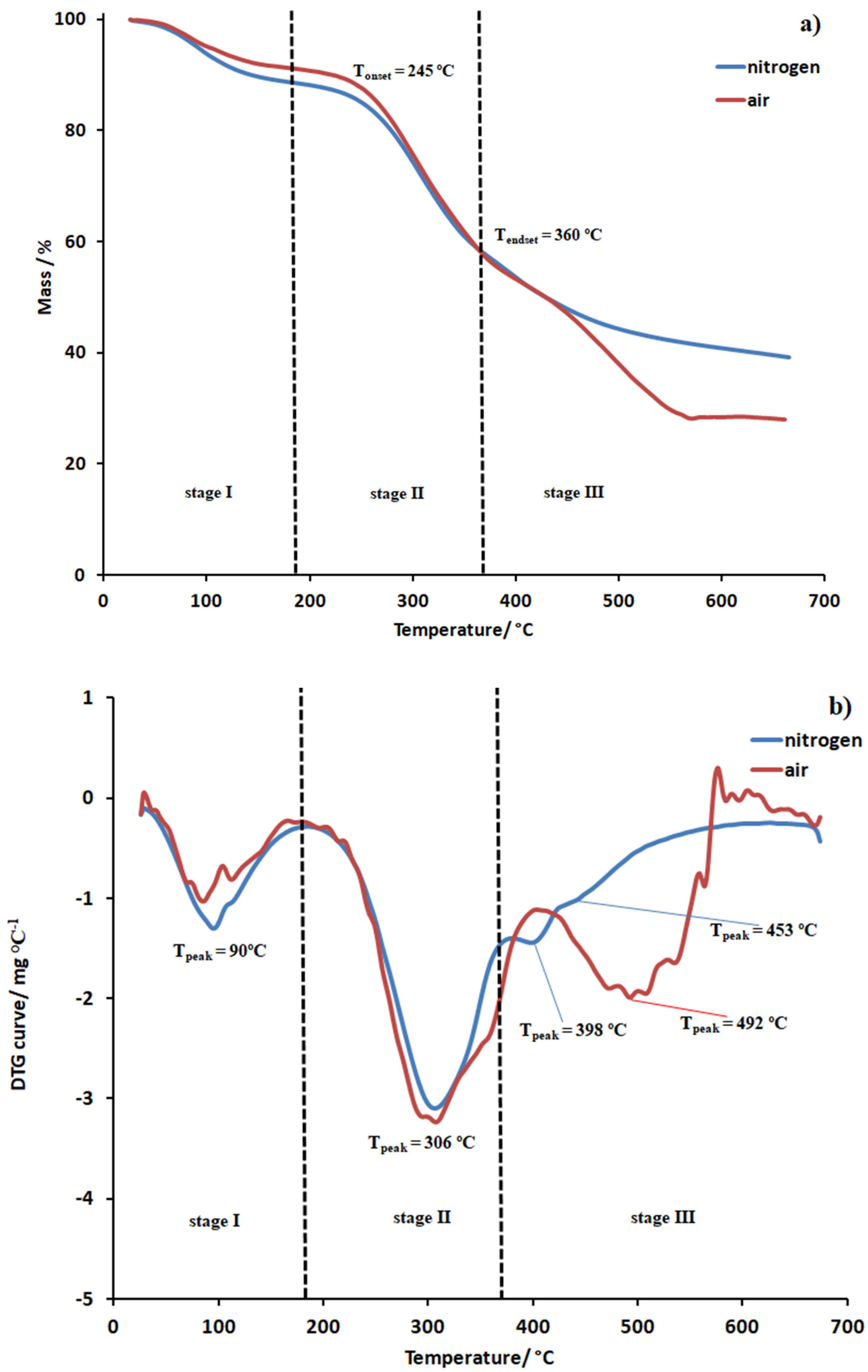


Figure S3. TG (a) and DTG (b) curves in air and nitrogen for sample 9

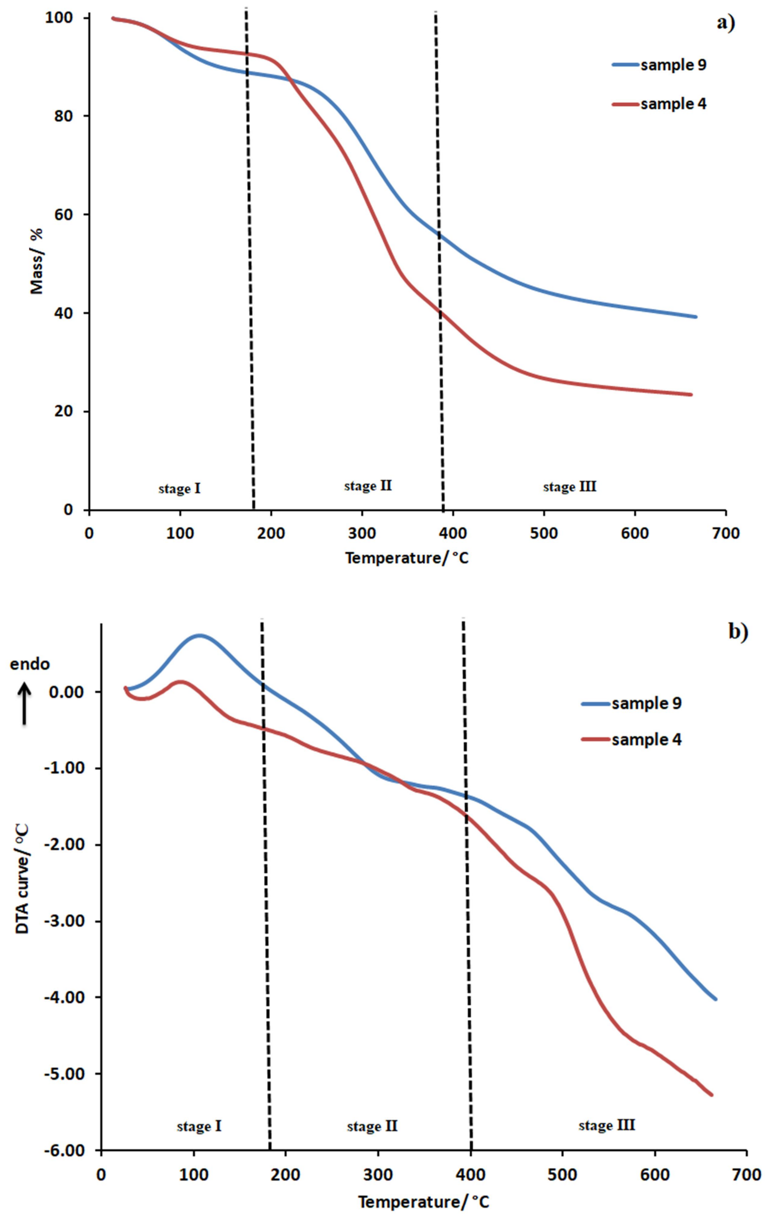


Figure S4. TG and DTA curves for samples 9 and 4 recorded in nitrogen

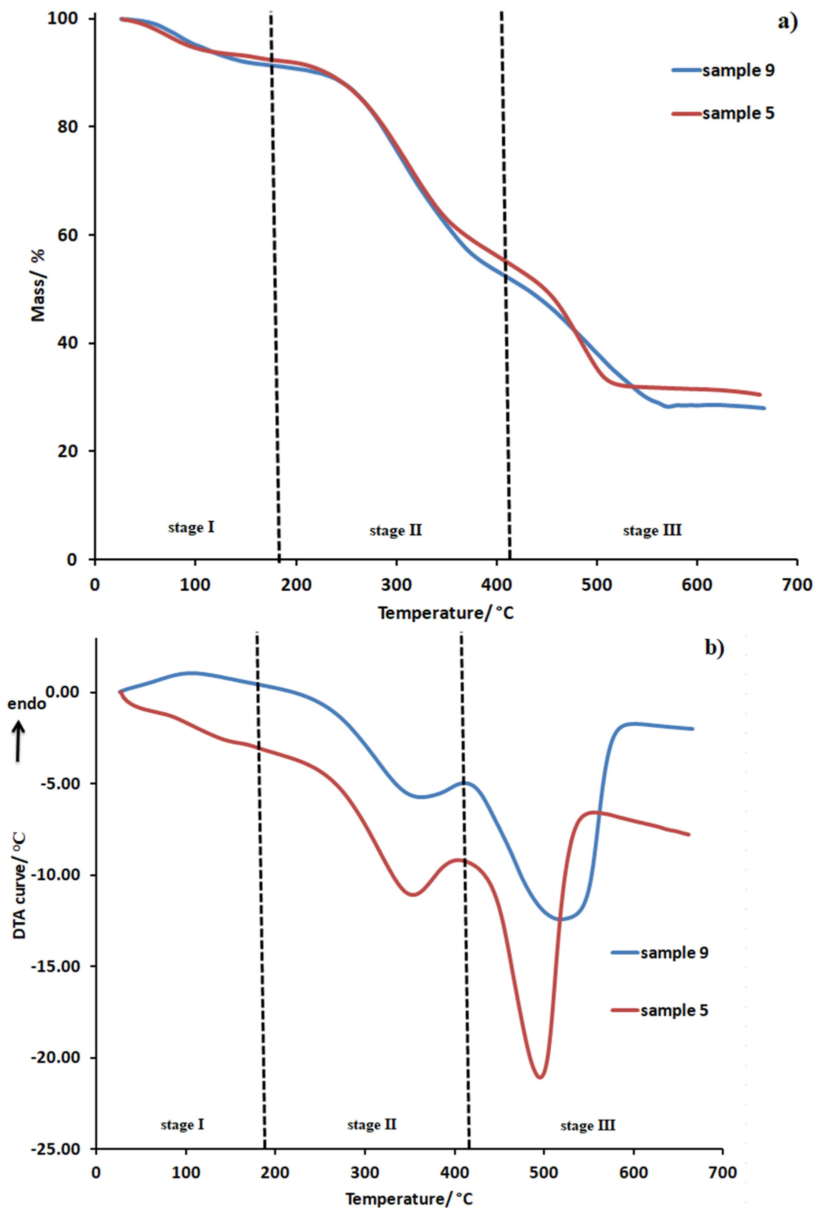


Figure S5. TG and DTA curves for samples 9 and 5 recorded in air

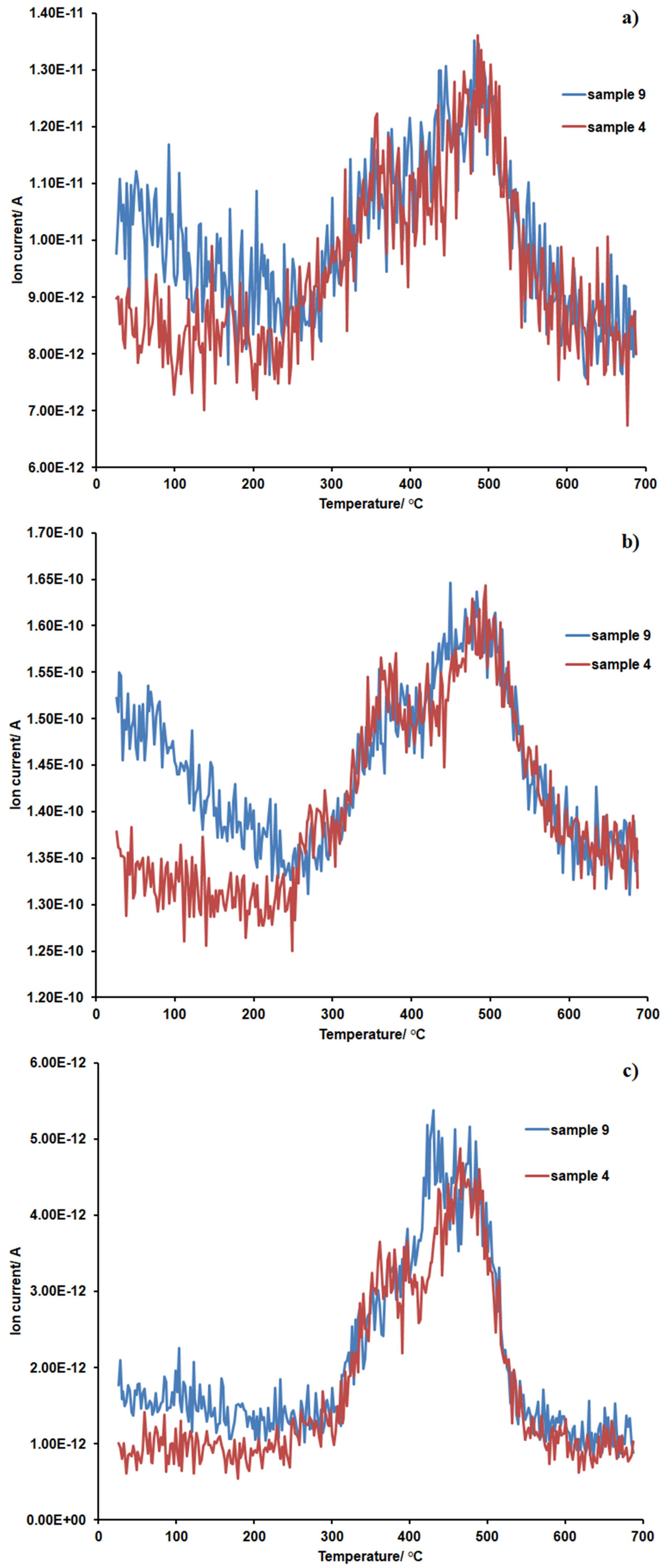


Figure S6. Ionic current variation with temperature for the fragments m/z=26 a), m/z=27 b) and m/z=39 c) for sample 9 and 4 (in nitrogen thermal analysis)

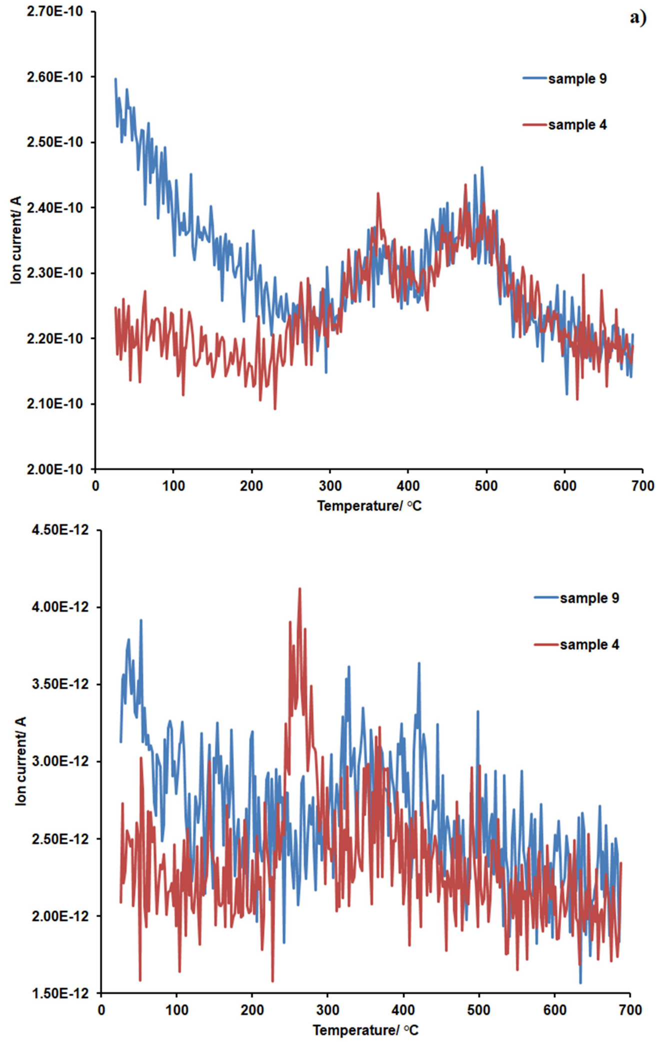


Figure S7. Ionic current variation with temperature for the fragments m/z=29 a) and m/z=31 b) for sample 9 and 4 (in nitrogen thermal analysis)

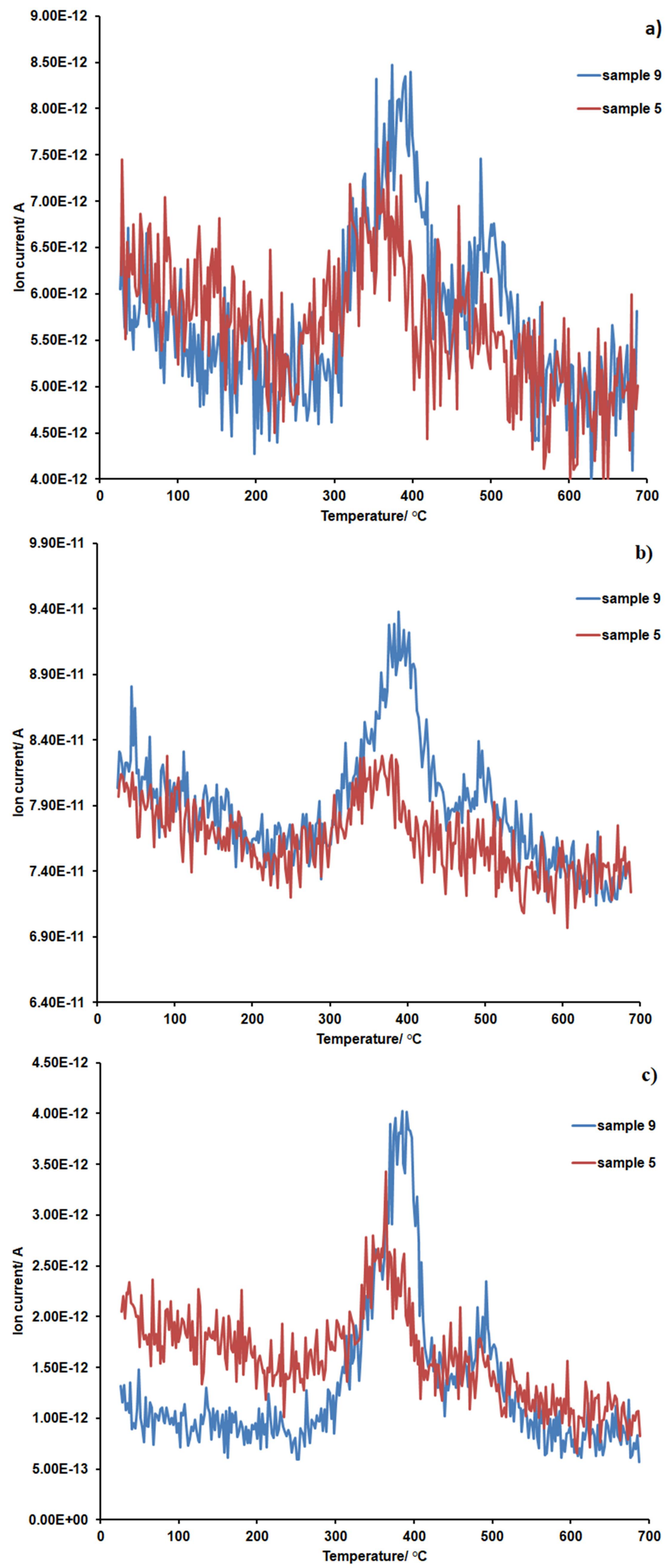


Figure S8. Ionic current variation with temperature for the fragments m/z=26 a), m/z=27 b) and m/z=39 c) for sample 9 and 5 (in air thermal analysis)

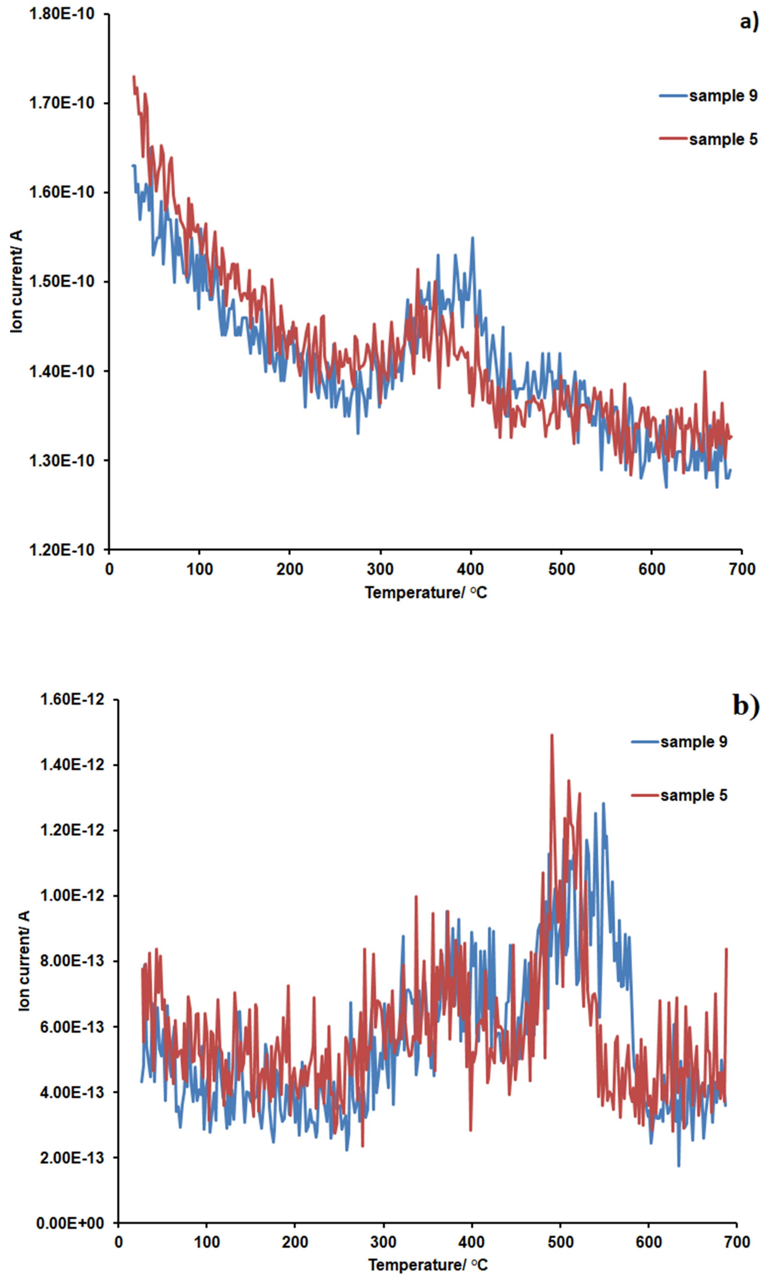


Figure S9. Ionic current variation with temperature for the fragments m/z=29 a) and m/z=46 b) for sample 9 and 5 (in air thermal analysis)

References

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