Electronic Supplementary Material (ESI) for Reaction Chemistry & Engineering.

The interplay between ternary molten carbonate and biomaterials during pressurized slow pyrolysis

Electronic Supplementary Information

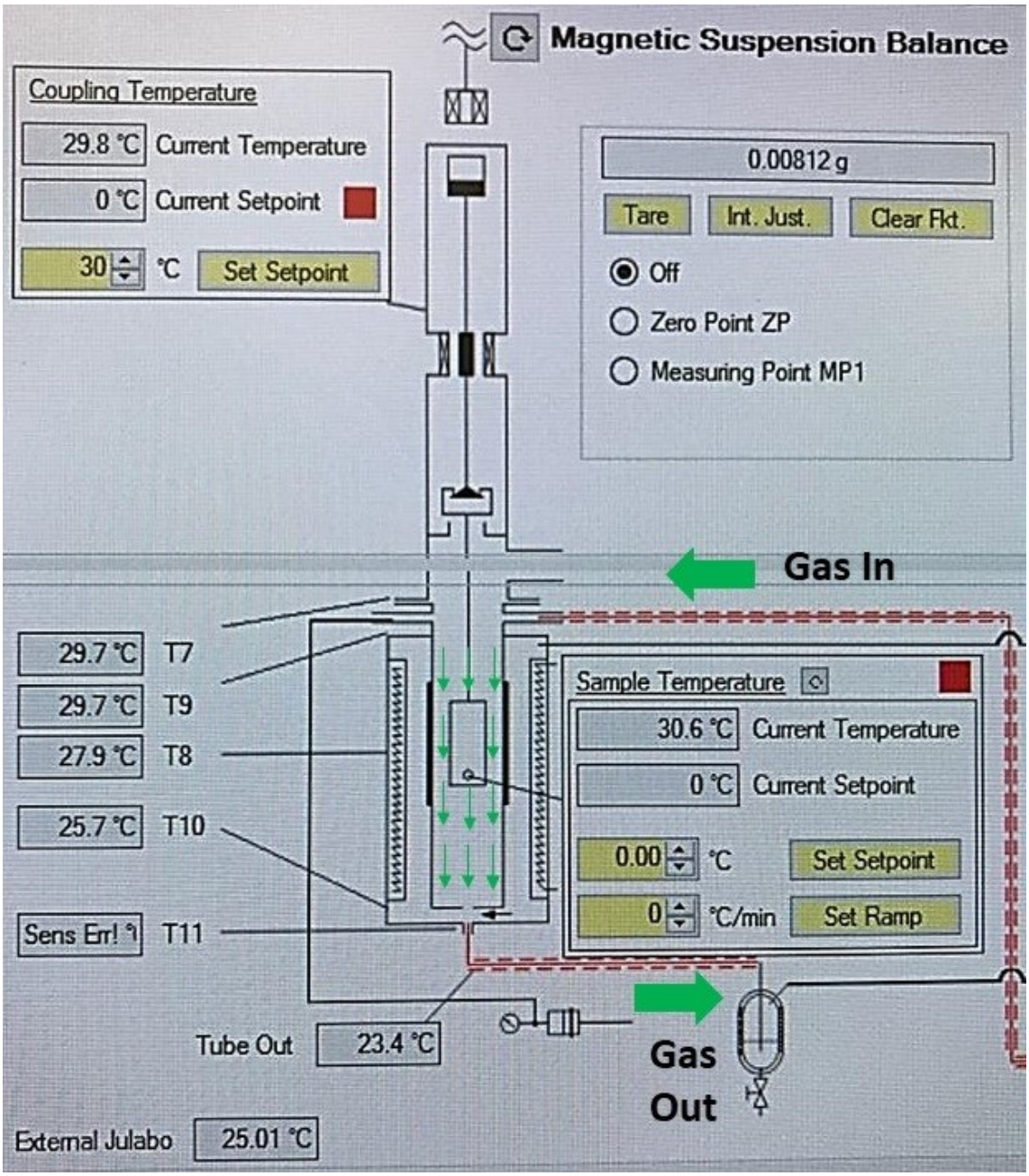


Figure-S1 The Schematic of High Pressure TGA used in this device (Ref: the picture is taken from apparatus screen)

Table-S1: Proximate and Ultimate Analysis of Samples (wt%)

		Proximate (dry Basis)			Ultimate Analysis				
	Moisture (%)	Volatile (%)	Fixed Carbon (%)	Ash (%)	C (%)	H (%)	N (%)	S (%)	O (%)
Blackbutt	4.3	79.7	18.7	1.6	48.9	6.6	0.0	0.3	44.2

Ref: https://doi.org/10.1021/acs.energyfuels.7b03221
https://doi.org/10.1021/acs.energyfuels.9b02865

		Proximate (dry Basis)			Ultimate Analysis				
	Moisture (%)	Volatile (%)	Fixed Carbon (%)	Ash (%)	C (%)	H (%)	N (%)	S (%)	O (%)
Kraft Lignin	10	48.6	33	18.4	52.3	4.7	38.1	4.8	0.1

Ref: 10.1016/j.jaap.2018.04.006

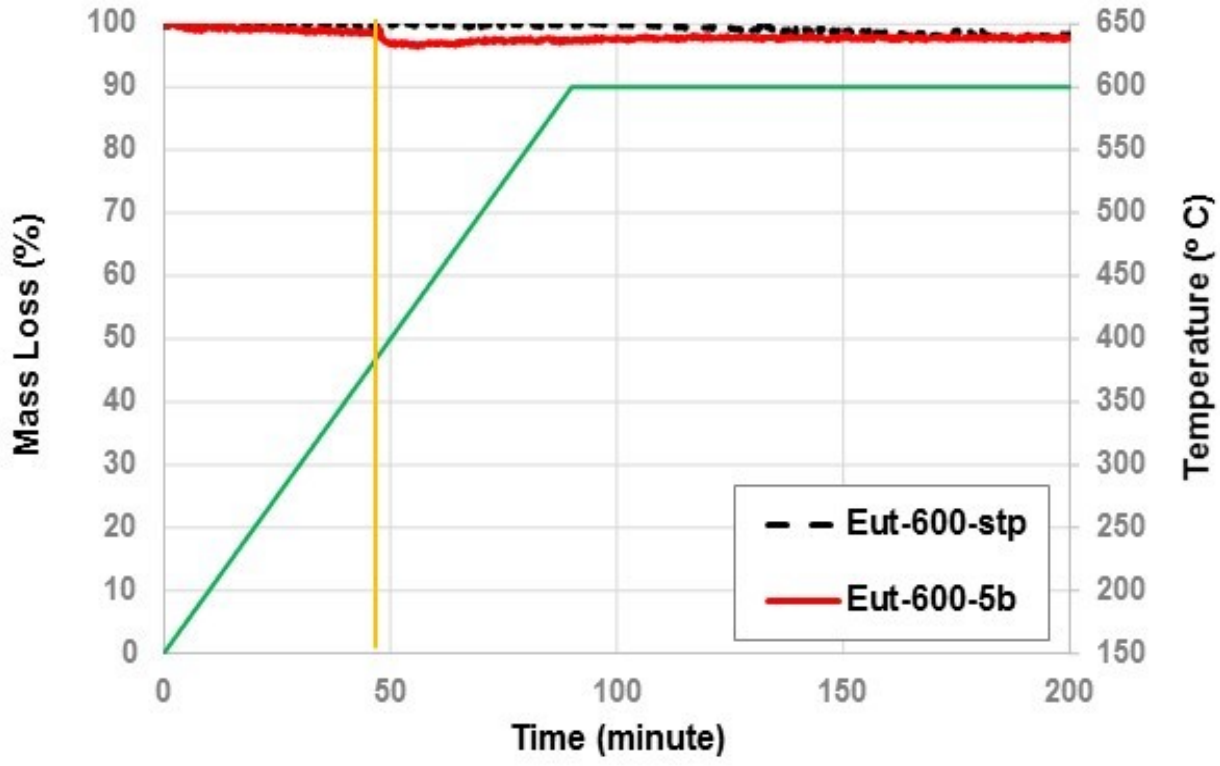


Figure S2- TGA curves of molten carbonate stability in standard pressure and 5bar during slow pyrolysis at 600 °C under N_2 with yellow line as an indication for carbonate melting point (~ 400 °C)

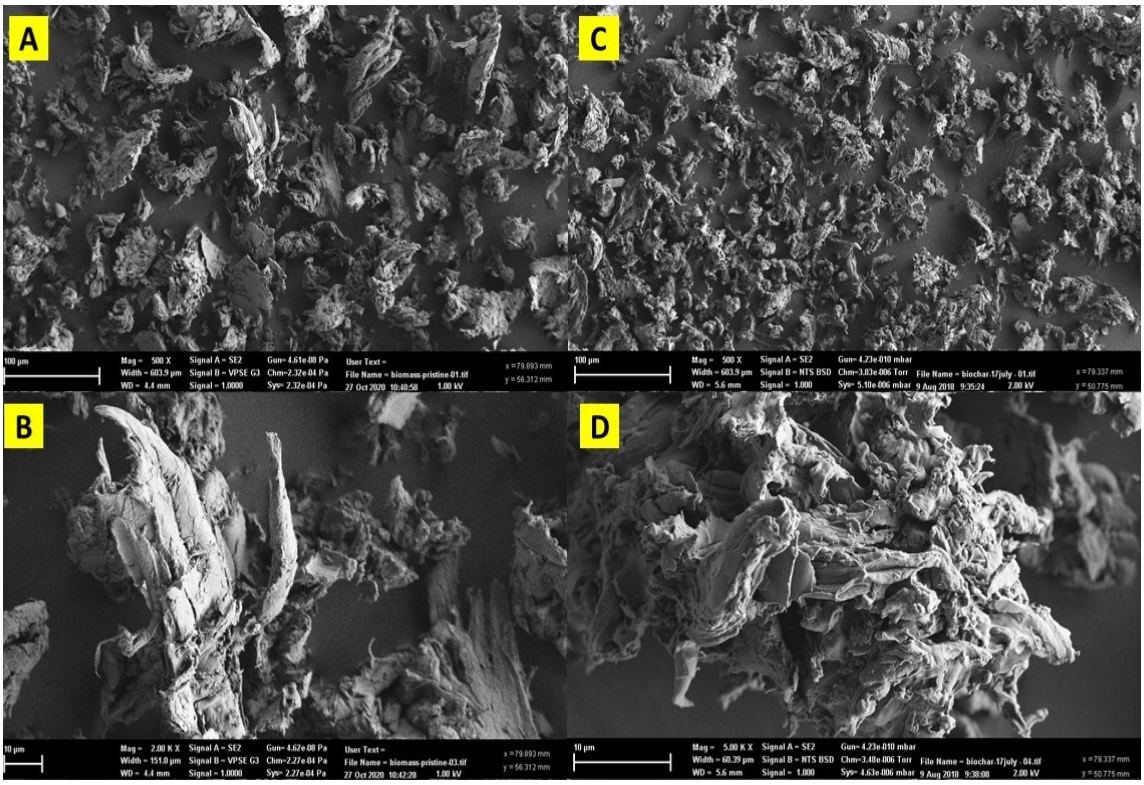
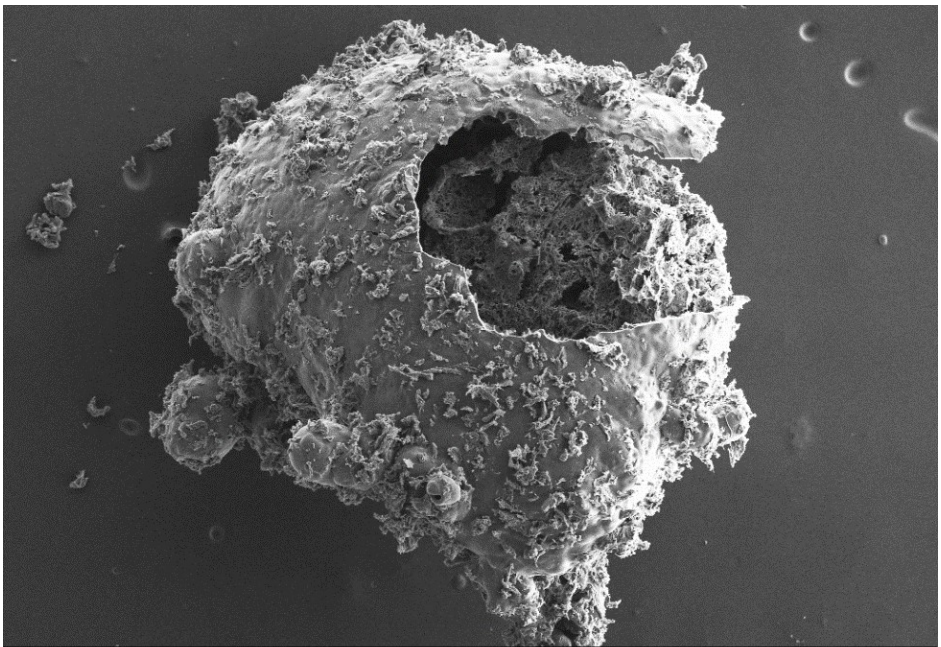


Figure S3- SEM images of raw biomass (A, B) and Bio-600-StP (C, D) from slow pyrolysis at 600 °C under N_2



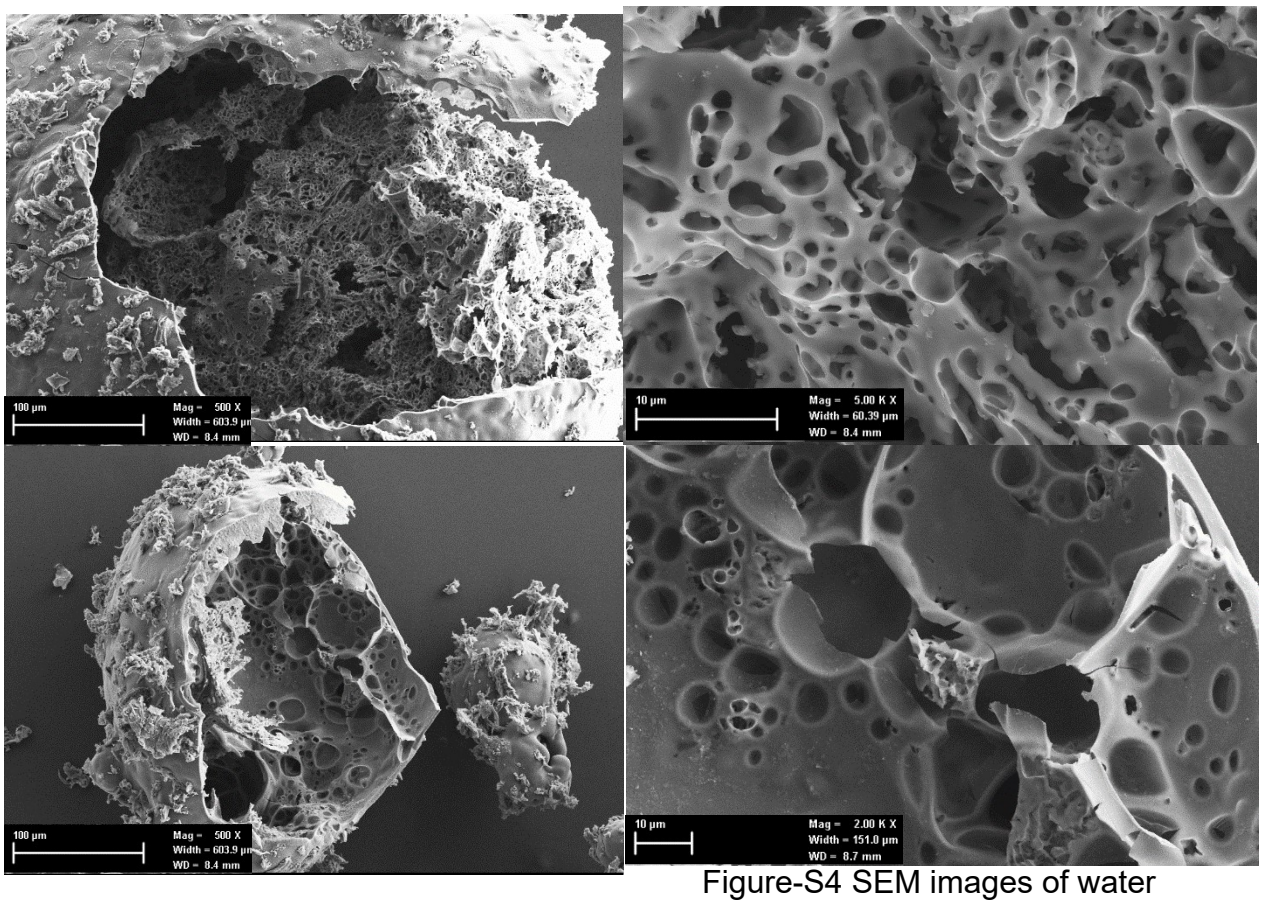
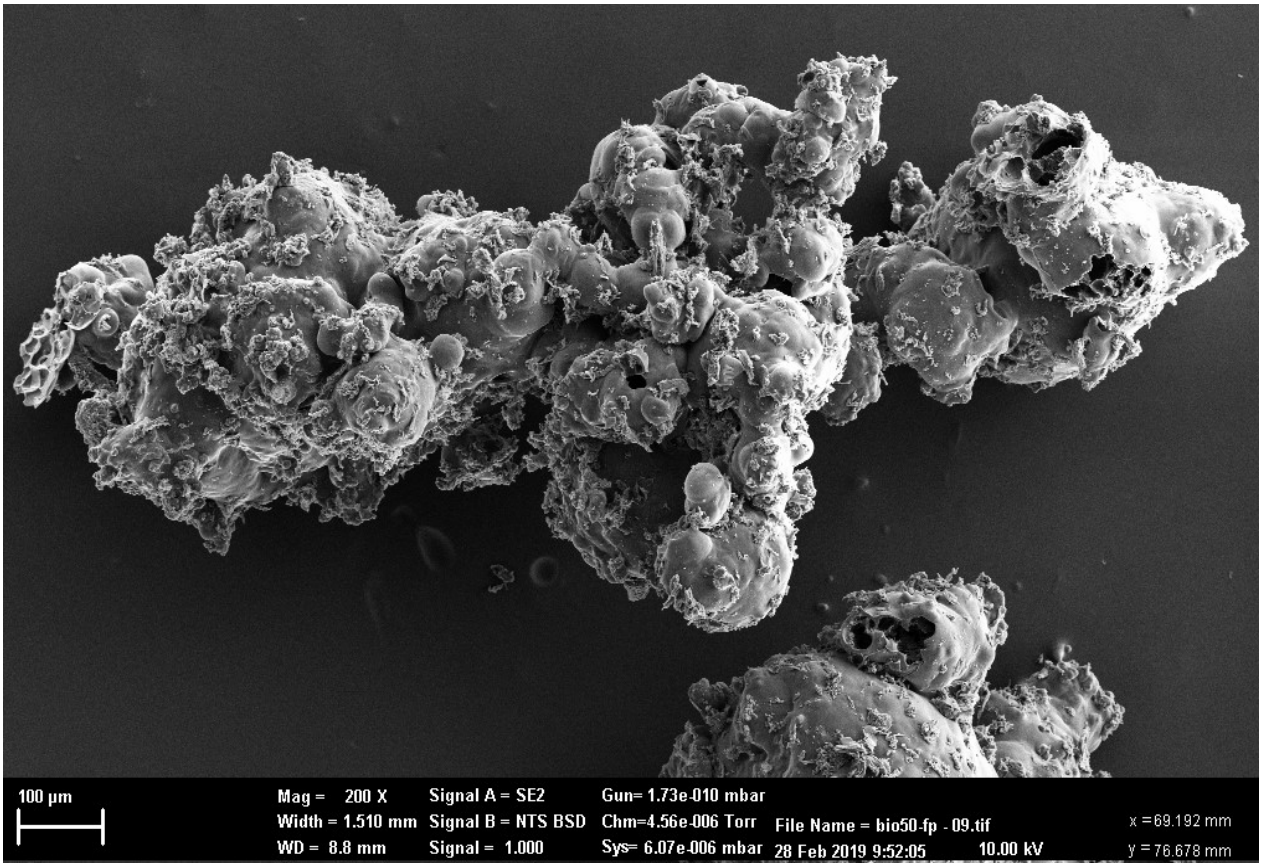


Figure-S4 SEM images of water washedBio50-600-5b from pyrolysis at 600°C under N2 with cracks on the wall



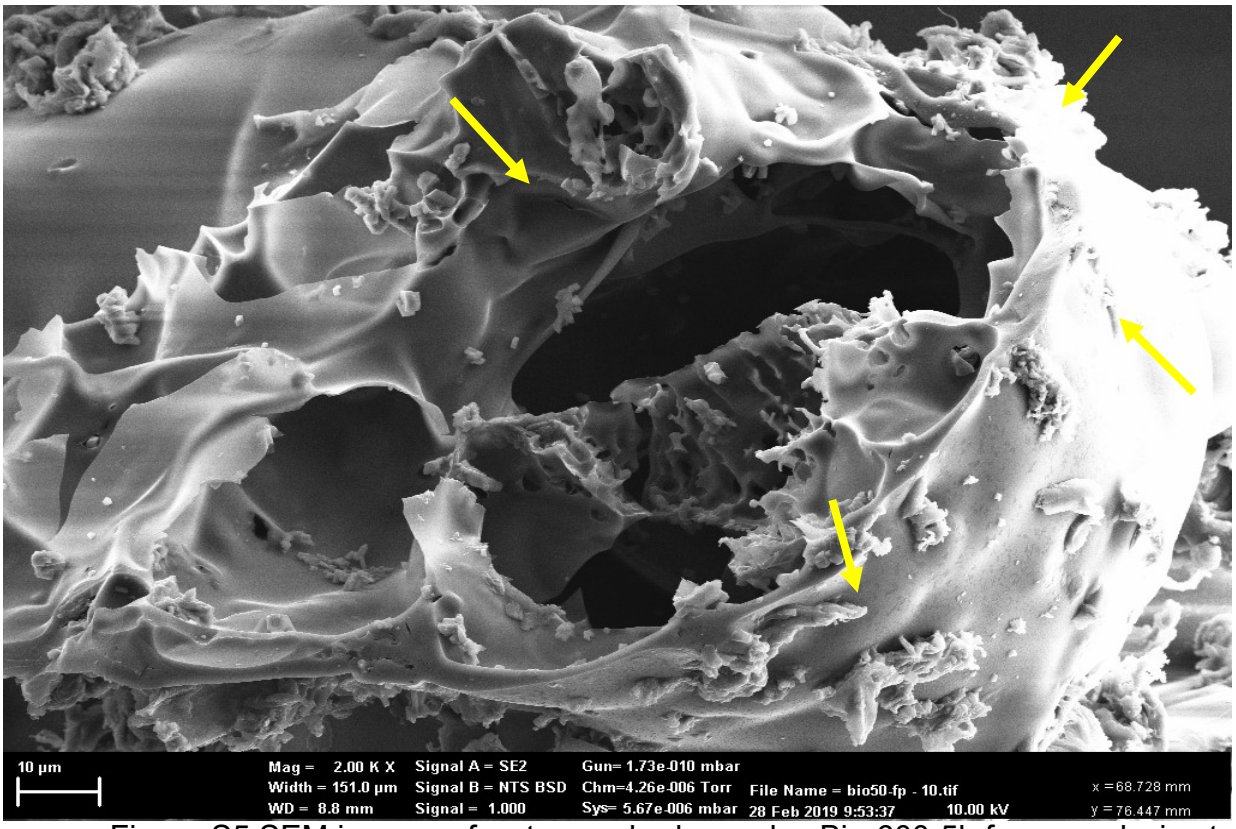


Figure-S5 SEM images of water washed samples Bio-600-5b from pyrolysis at 600°C under N_2 with wide tunnel

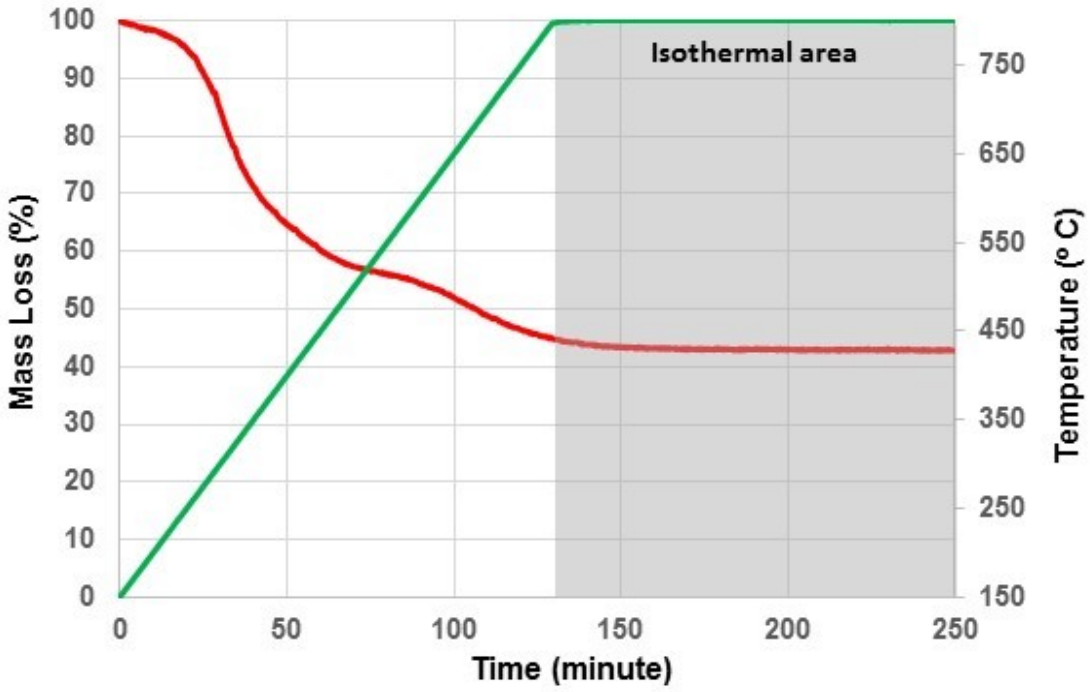


Figure S6- TGA curve of Lignin devolatization in standard pressure during slow pyrolysis at 800 °C under N_2 with highlight isothermal area

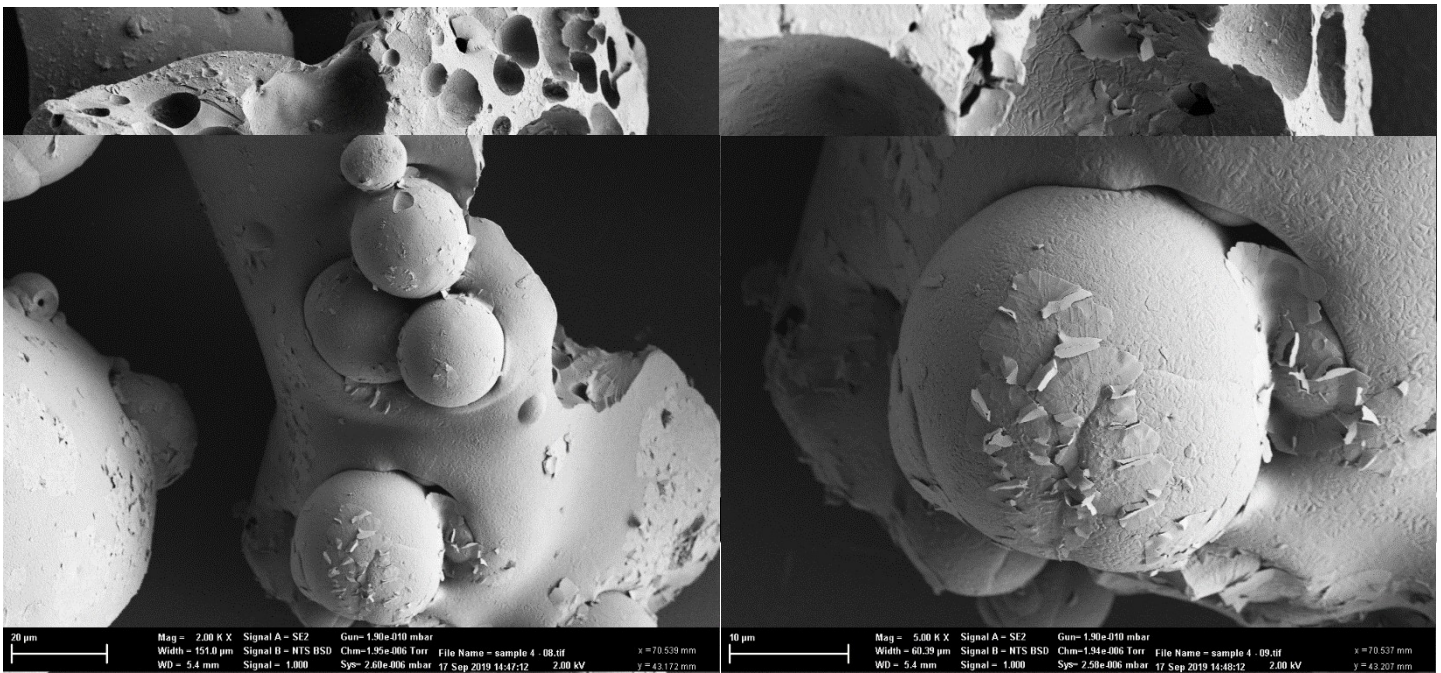


Figure S7- SEM images of Lig50-350-StP produced at 350 ^{o}C under N_2

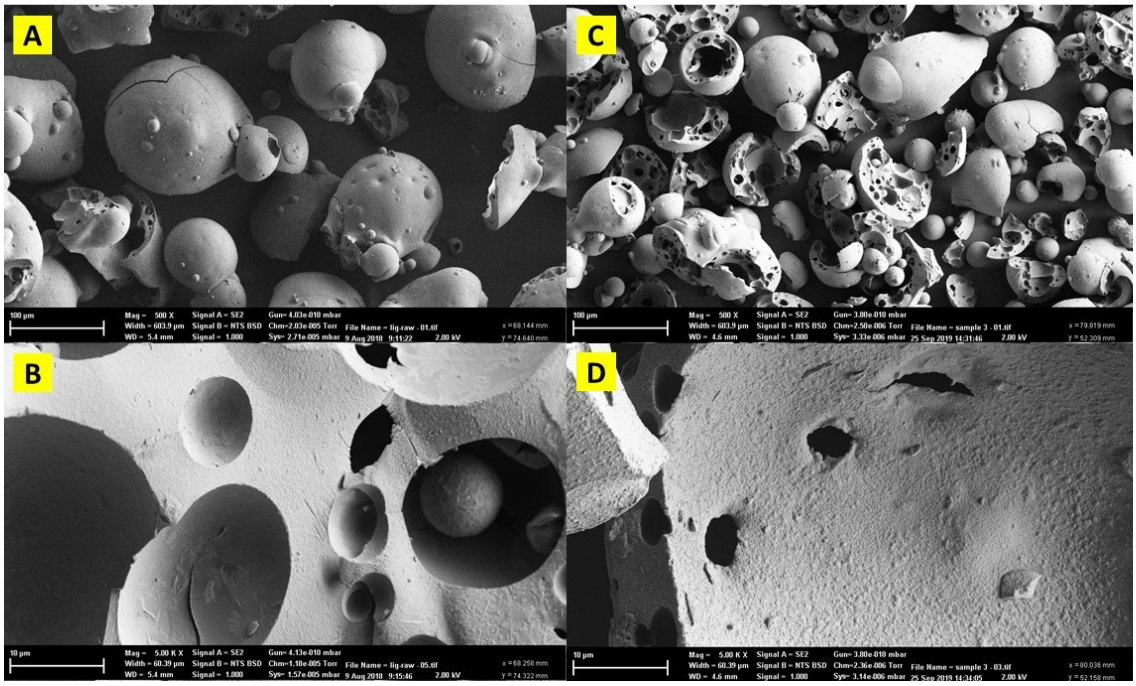


Figure S8- SEM images of raw Lignin (A, B) and Lig-600-StP (C, D) from slow pyrolysis at 600 under N_2

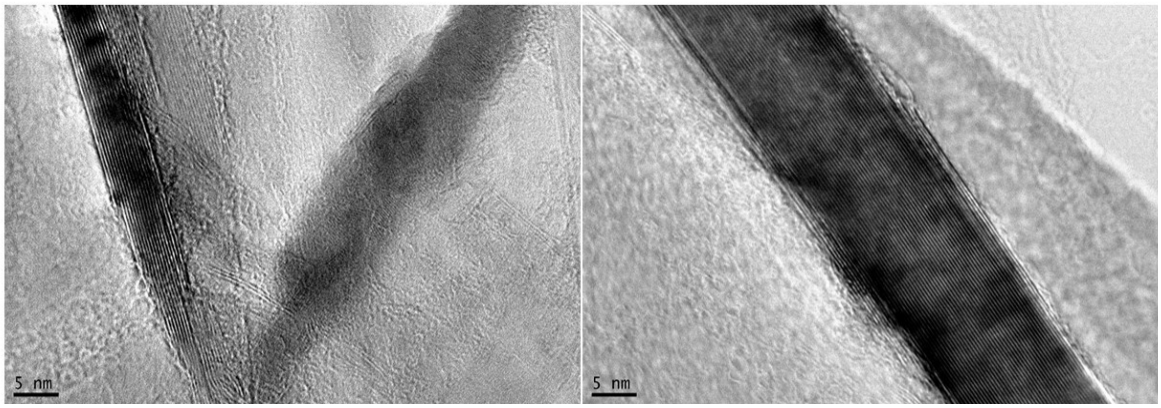


Figure S9- TEM images of biochar from slow pyrolysis in standard pressure at 600 under N_2

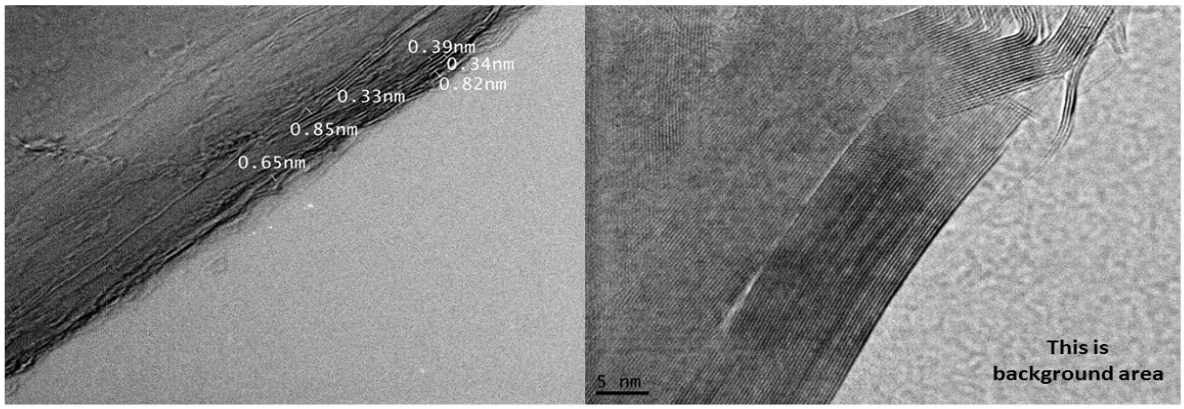


Figure S10- TEM images of different edges and particles of water washed Bio50-800-StP from pyrolysis at 800 under N_2

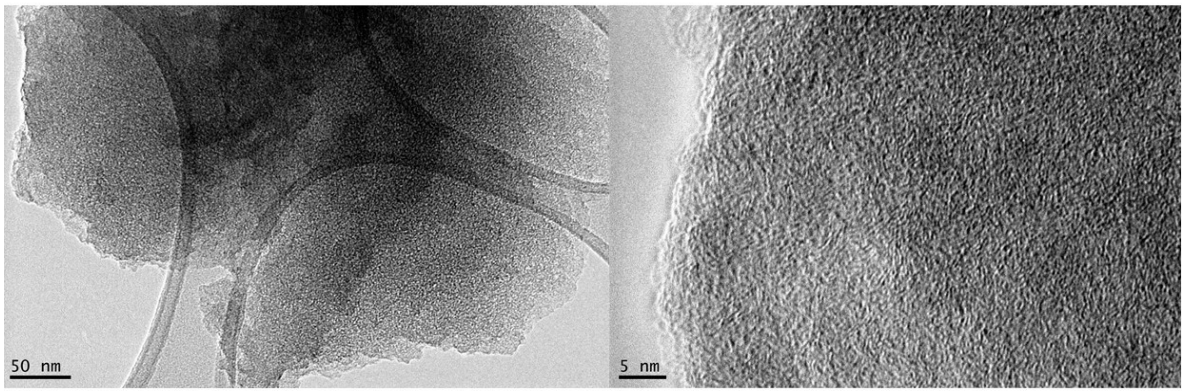


Figure S11- TEM images of different edges and particles of water washed Bio50-800-5b from pyrolysis at 800 under N_2

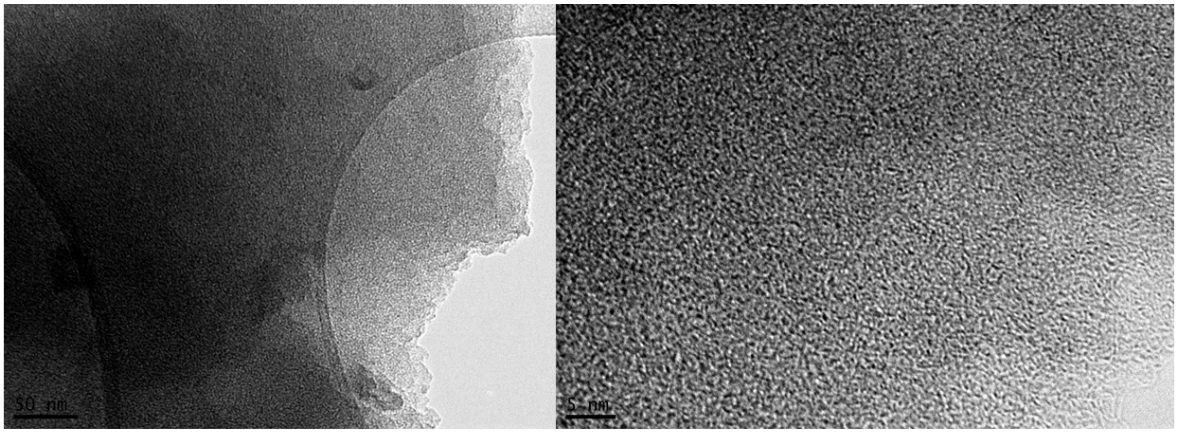


Figure S12- TEM images of ligchar from slow pyrolysis in standard pressure at 600 under N_2

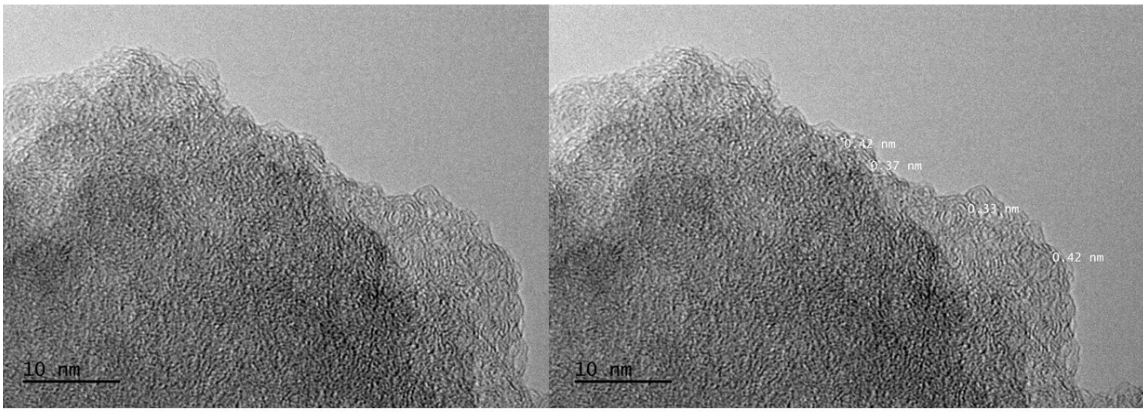


Figure S13- TEM images of different edges and particles of water washed Lig50-800-StP from pyrolysis at 800 under N_2

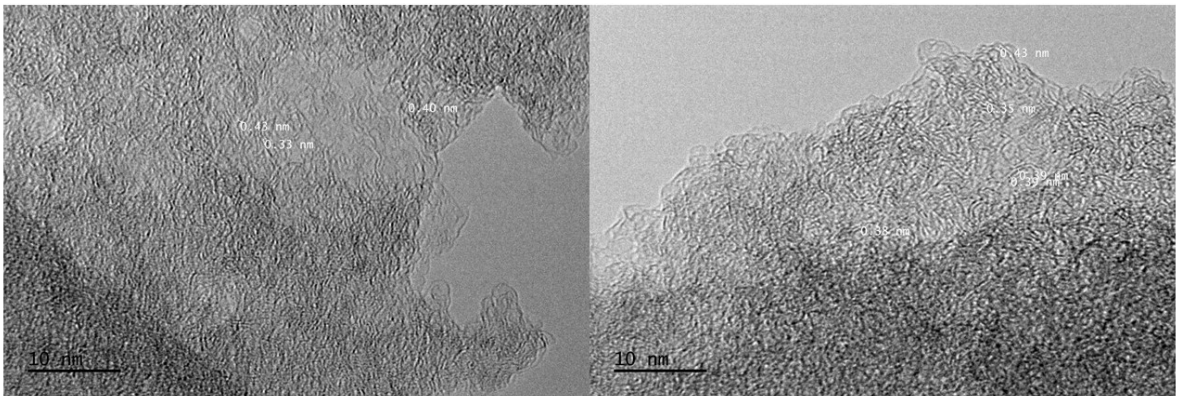


Figure S14- TEM images of different edges and particles of water washed Lig50-800-5b from pyrolysis at 800 under N_2