Electronic Supplementary file

Plasma-deposition of α-FeOOH particles on biochar using a gliding arc discharge in humid air: A green and sustainable route for producing oxidation catalysts

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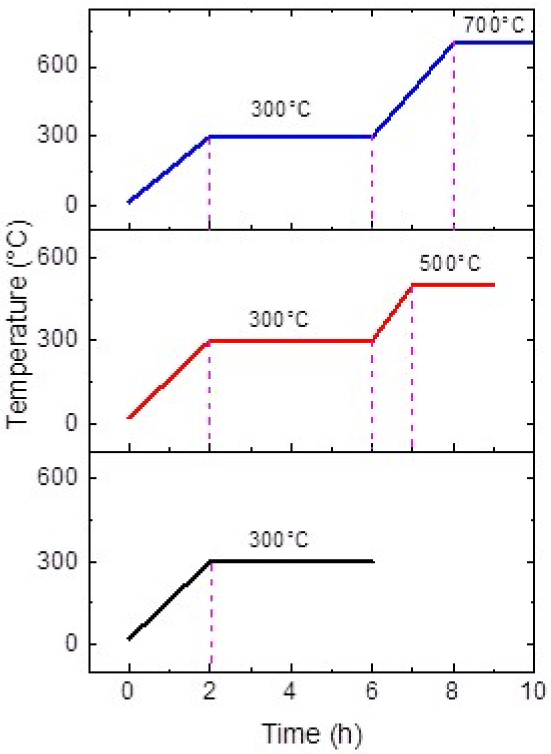

Fig. S1 Chart describing the three carbonization programs used for producing biochars from raffia bamboo pith

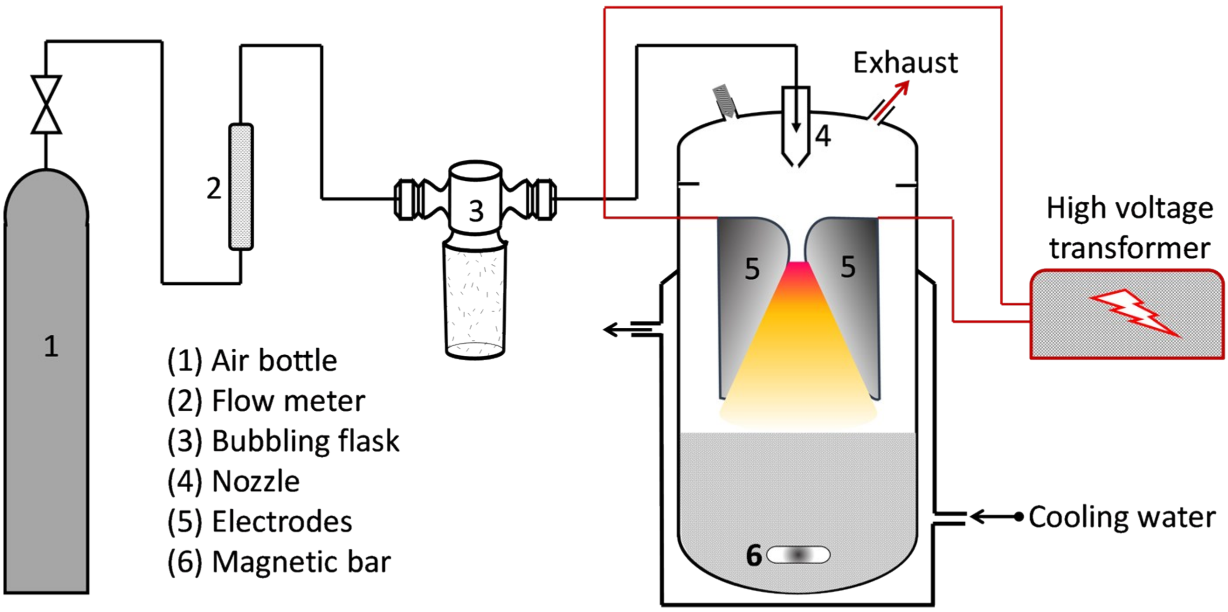

Fig. S2 Scheme of the gliding arc plasma setup used for goethite deposition

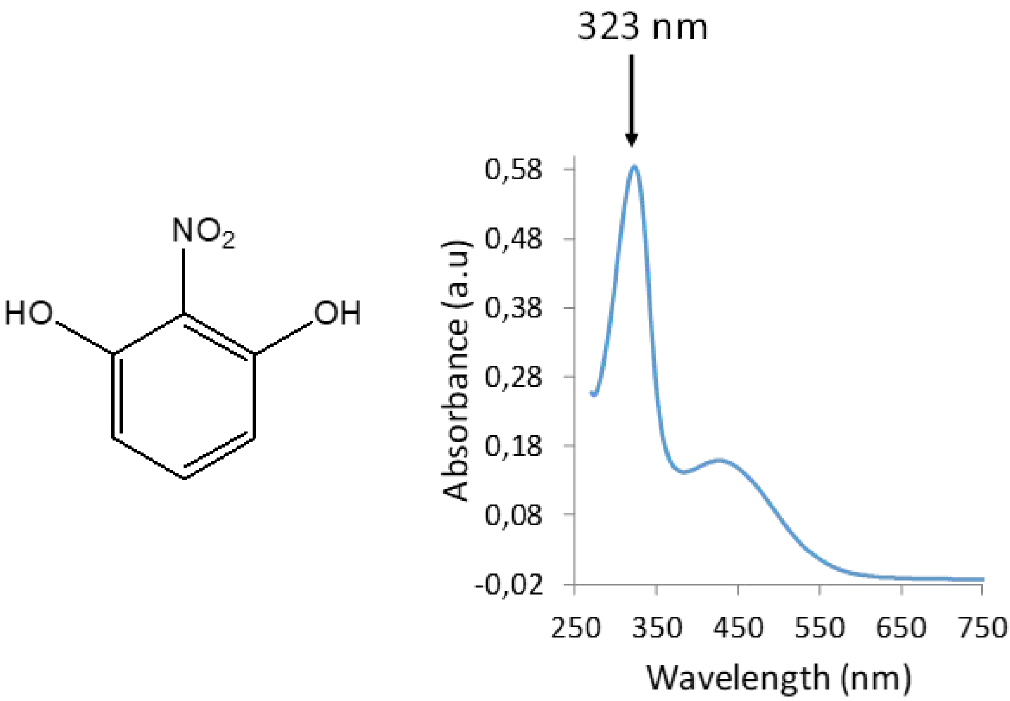

Fig. S3 Chemical structure and Ultraviolet – Visible spectrum of nitroresorcinol showing a strong absorption band at 323 nm

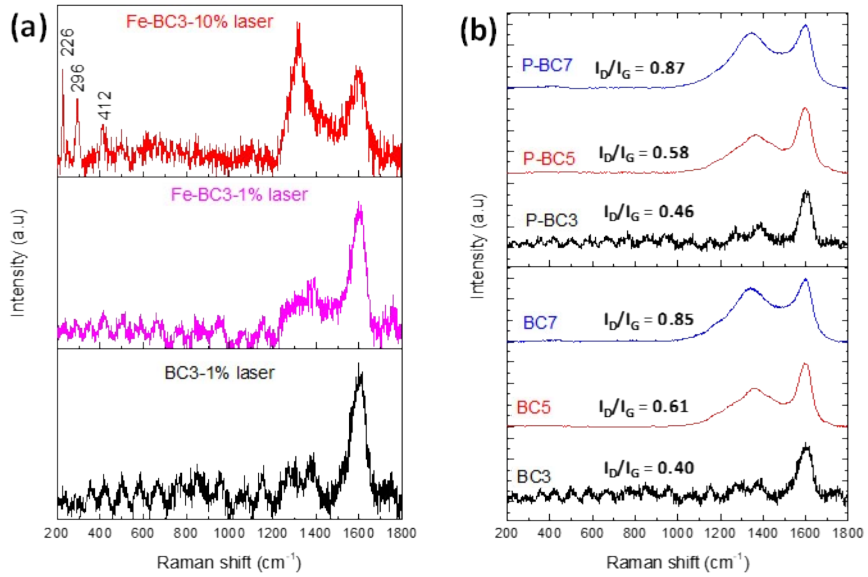

Fig. S4 (a) Effect of laser power on the Raman behavior of Fe-BC3: Using 10% laser induces local heating of material, thus inducing further carbonization of BC3 and thermal transformation of goethite to hematite. (b) Raman spectra of BCT and P-BCT: the I_D/I_G ratios almost have the values after plasma treatment, suggesting that plasma induced no structural modification of biochar.

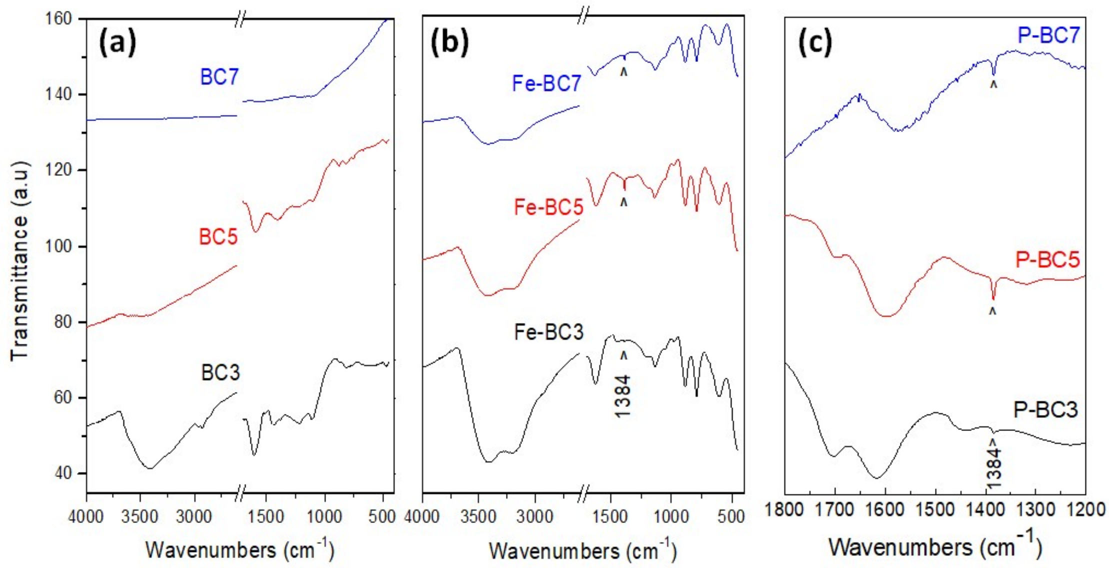

Fig. S5 FTIR spectra of (a) BCT, (b) Fe-BCT and (c) P-BCT. The strong band at 1384 cm-1 is attributed to the in plane bending vibration of C-OH group in carbon-based materials and confirm that the surface of biochar has been hydroxylated after plasma treatment.

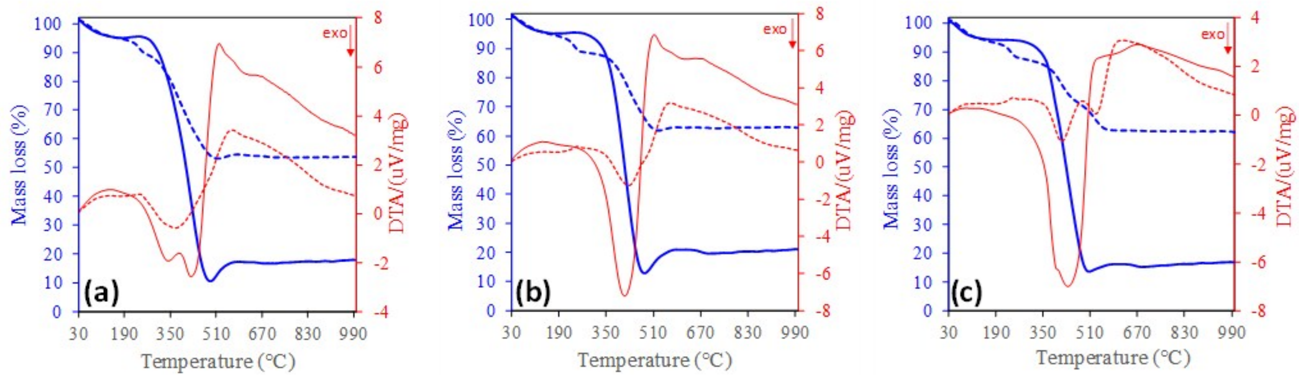

Fig. S6 TGA and DTG curves of (a) BC3 and Fe-BC3, (b) BC5 and Fe-BC5 and (c) BC7 and Fe-BC (continuous line: BCT; dash line: Fe-BCT)

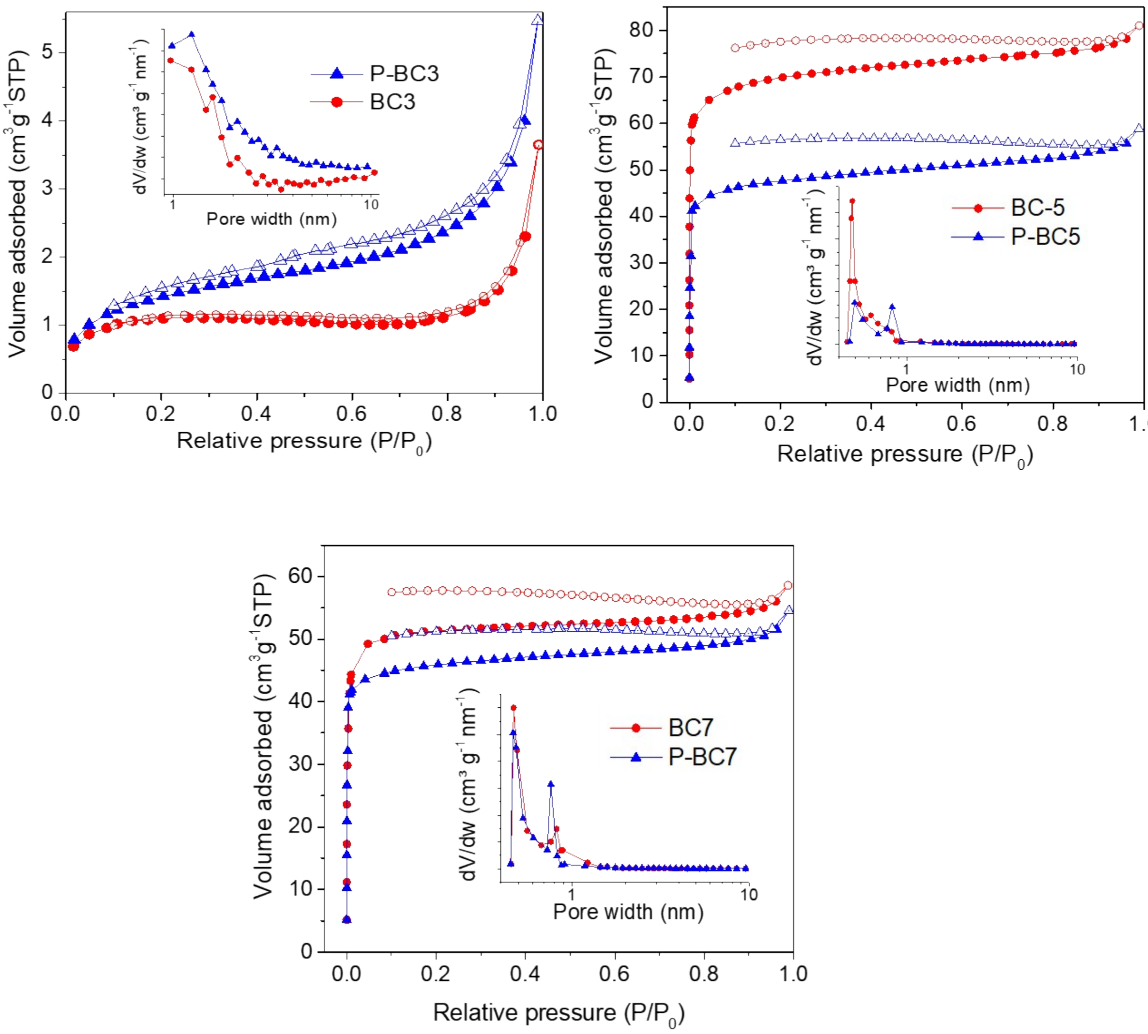

Fig. S7 Nitrogen adsorption-desorption isotherms of BCT and P-BCT. The insets represent the corresponding Horvath-Kawazoe pores size distribution curves.

Table S1 Weight percentages (obtained from thermogravimetric analysis) used for determining the goethite weight content in each Fe-BCT sample

	%m1	%m2	%m3	α-FeOOH content (+/- 5%)
Fe-BC3	10,5	53,3	5,7	48,5
Fe-BC5	12,8	61,8	6,5	55,5
Fe-BC7	13,7	62,7	6,7	55,7

$\%m_1$ = residual weight percentage after oxidative decomposition of carbon in BCT
$\%m_2$ = residual weight percentage after oxidative decomposition of carbon in Fe-BCT
$\%m_3$ = percentage of mass loss corresponding to goethite transformation into hematite