

Supplementary Information

Nanoscale Mapping of Carbon Oxidation in Biochar from Ancient Anthrosoils

B.S. Archanjo^{a,1*}, D. L. Baptista^{b,1}, L. A. Sena^a, L. G. Cançado^{a,c}, N.P.S. Falcão^d, A. Jorio^c, C.A. Achete^{a,c}

^aInstituto Nacional de Metrologia, Qualidade e Tecnologia, Av. Nossa Senhora das Graças, 50, 25250-020 Duque de Caxias, RJ, Brazil.

^bInstituto de Física, PPGMicro, Universidade Federal do Rio Grande do Sul, Porto Alegre, RS, 91501-970, Brazil.

^cDepartamento de Física, ICEx, Universidade Federal de Minas Gerais, Belo Horizonte, MG 30123-970, Brazil

^dDepartamento de Ciências Agrônômicas, Instituto Nacional de Pesquisas da Amazônia, Manaus, AM 69011-970, Brazil

^eDepartamento de Engenharia Metalúrgica e de Materiais, Universidade Federal do Rio de Janeiro, Cx. Postal 68505, Rio de Janeiro, RJ 21945-970, Brazil

Balbina – TPI_{BB} –, Presidente Figueiredo (Lat. 1° 54' S, Long. 59° 28' W)

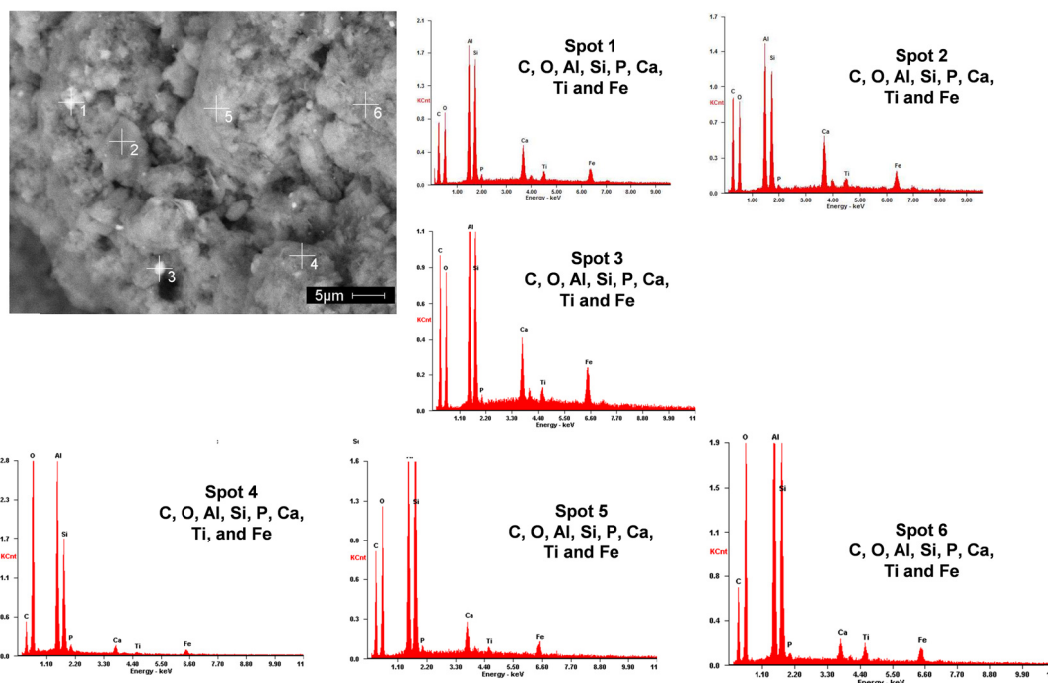


Figure S1 (complementary to the Fig. 1a from the main text). Here we show the micro scale analyses via EDX spectra, collected at 6 spots as indicated in the micrograph.

Costa do Laranjal – TPI_{CL} –, Manacapuru (Lat. 3° 18' S, Long. 60° 33' W)

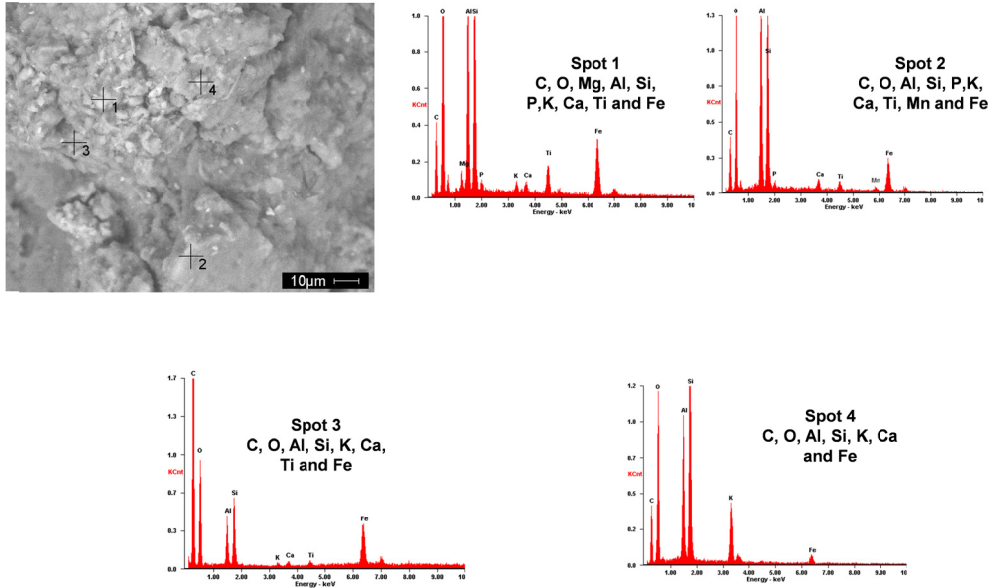


Figure S2 (complementary to the Fig. 1b from the main text). Here we show the micro scale analyses via EDX spectra, collected at 4 spots as indicated in the micrograph.

Serra Baixa – TPI_{SB} – (costa do Açutuba), Iranduba (Lat. 3° 30' S, Long. 60° 20' W)

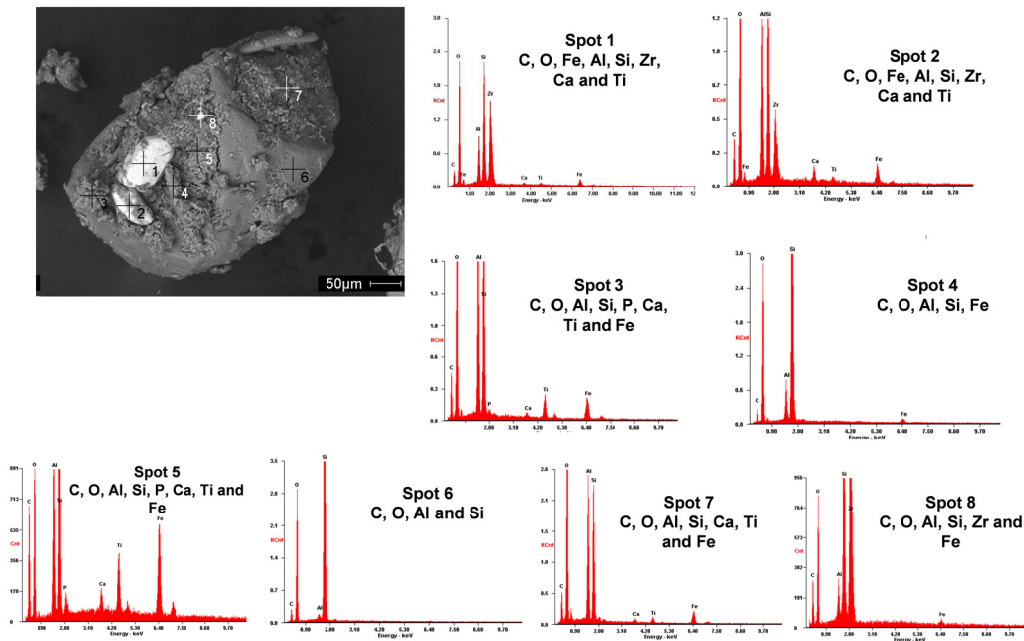


Figure S3 (complementary to the Fig. 1c from the main text). Here we show the micro scale analyses via EDX spectra, collected at 8 spots as indicated in the micrograph.

Charcoal from Ingá wood (*Ingá edulis* Mart.)

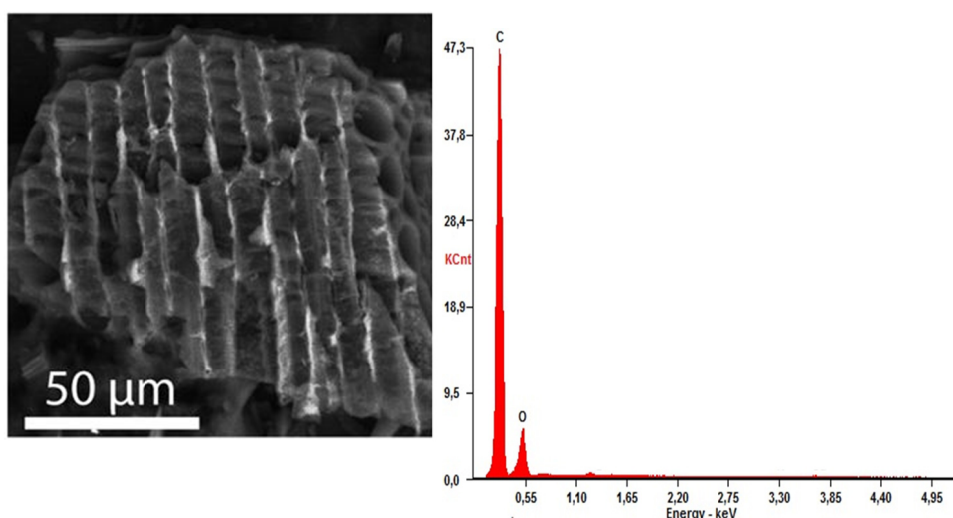


Figure S4 (complementary to the Fig. 1e from the main text). Here we show the micro scale analyses via EDX spectra, collected in region at the center of the charcoal grain shown in electron micrograph. The charcoal grain is from Ingá wood (*Ingá edulis* Mart.), a typical plant species of Amazon. As expected carbon and oxygen are the main elements.

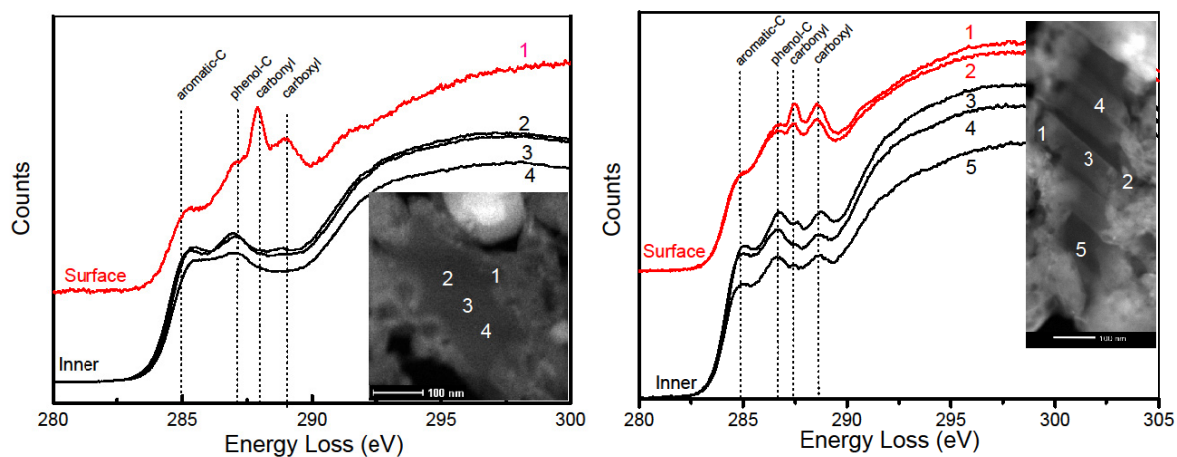


Figure S5 (complementary to the Fig. 4 from the main text) Chemical bonding information of two different TPI-carbon grains taken from Serra Baixa – TPI_{SB}. Both figures show EELS spectra from different parts of the grain and the respective transmission electron microscopy image. Here, as discussed in the main text, the same behavior is observed since the organic radicals (aromatic, phenol, carbonyl and carboxyl) are observed all over the grains. Furthermore the signal intensity of the carbonyl and carboxyl are more prominent in the surface than in the inner part of the grains.