

SUPPLEMENTARY INFORMATION (SI)

Environmental evaluation of carbon dots and fullerene formations in atmospheric particulate matter (PM₁₀): observations from their free radical scavenging and electrochemical studies

Nazrul Islam^{ab}, Mousumi Bora^{ab}, Monikankana Saikia^{ab}, Anusuya Boruah^{ab}, Kallol Roy^c, Rituraj Konwar^c, Binoy K Saikia^{ab*}

^aCoal & Energy Division, CSIR-North East Institute of Science & Technology, Jorhat 785006, India

^bAcademy of Scientific & Innovative Research (AcSIR), Ghaziabad 201002, India

^cBiotechnology Group, Biological Science and Technology Division, CSIR-North East Institute of Science and Technology, Jorhat-785006, Assam, India



Figure S1: Showing the study area (in Google Earth) and India map (inset) highlighting the North eastern region of India (a); and Respirable Dust Sampler used for the collection of PM_{10} (b).

Table S1: XPS analysis showing the presence of elements in synthesized wsCDs.

Name	Peak	FWHM (eV)	Atomic (%)
K2p	294.74	4.2	0.2
O1s	531	4.48	40.52
C1s	284.33	4.89	43.16
N1s	1070.32	4.42	5.55
Si2p	101.84	4.19	7.98
N1s	398.6	4.59	1.68
Cl2p	197.8	5.28	0.9

Table S2: XPS analysis showing the presence of elements in synthesized wsOLFs.

Name	Peak	FWHM (eV)	Atomic (%)
O1s	531.98	4.65	34.54
C1s	284.29	4.71	51.82
S2p	168.65	4.47	6.58
Na1s	1071.68	5.02	1.42
N1s	400.9	4.46	2.08
Si2p	102.66	4.26	2.91
Ca2p	347.6	6.9	0.63

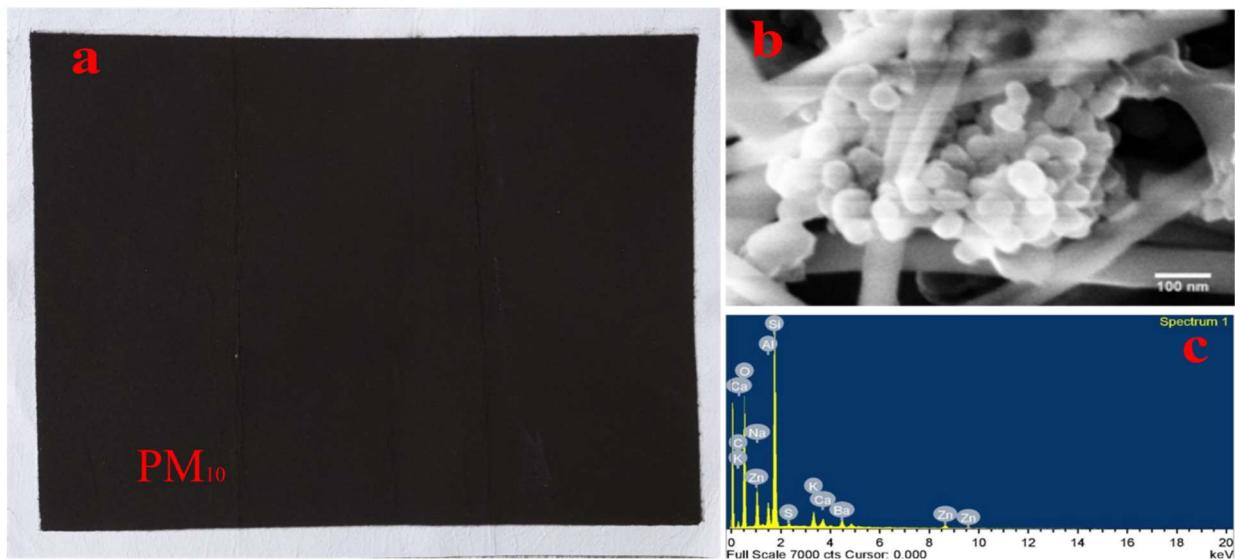


Figure S2: (a) Showing the deposition of atmospheric PM₁₀ in quartz microfibre filters utilised as a source for synthesis of carbon nanomaterials, (b) FE-SEM micrograph of PM₁₀ showing the particle morphology without any chemical treatment, and (c) Elemental composition of PM₁₀ analyzed by FE-SEM EDS without any chemical treatment.

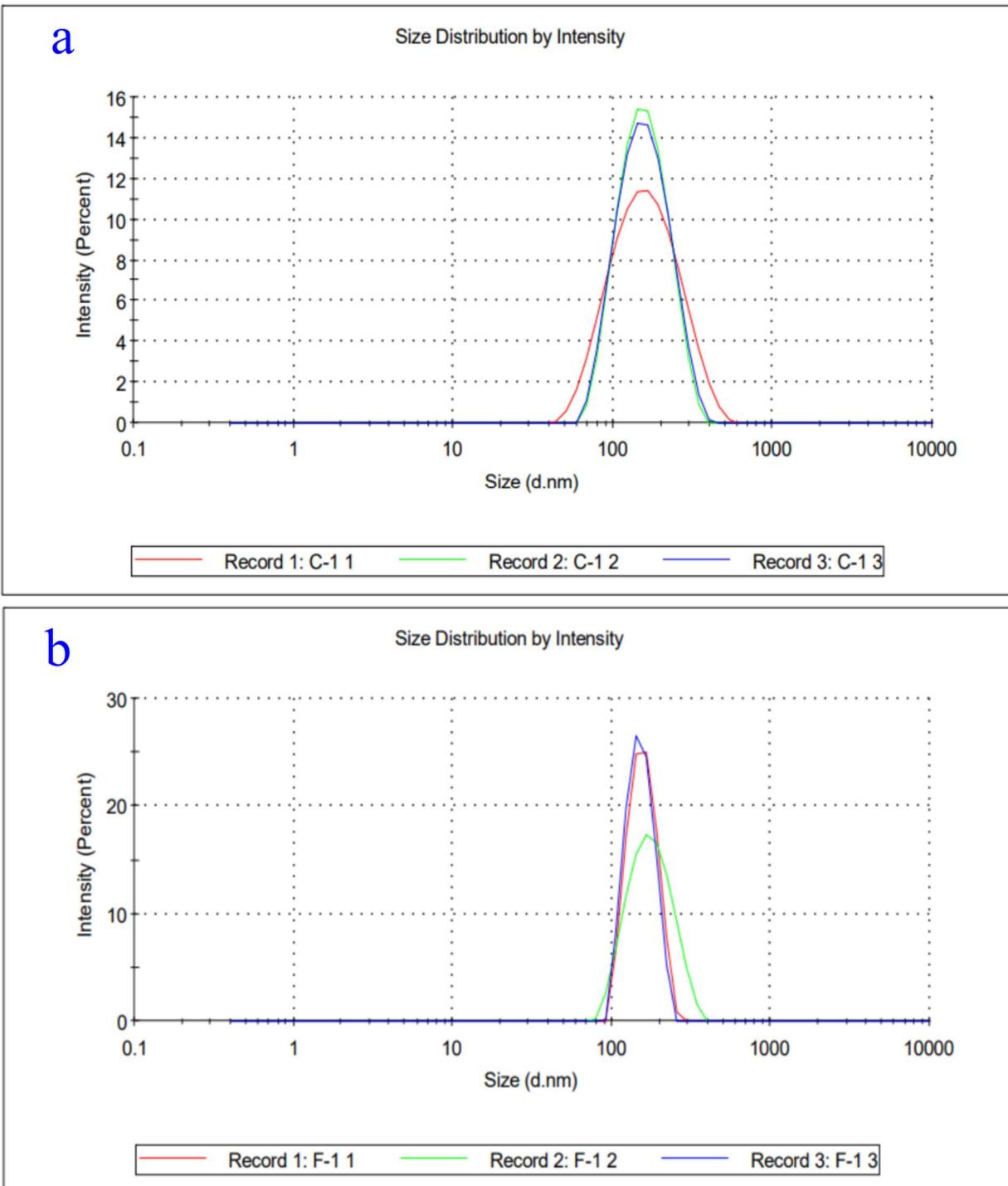


Figure S3: Dynamic Light Scattering (DLS) Analysis of PM derived wsCDs (a) and wsOLFs (b).

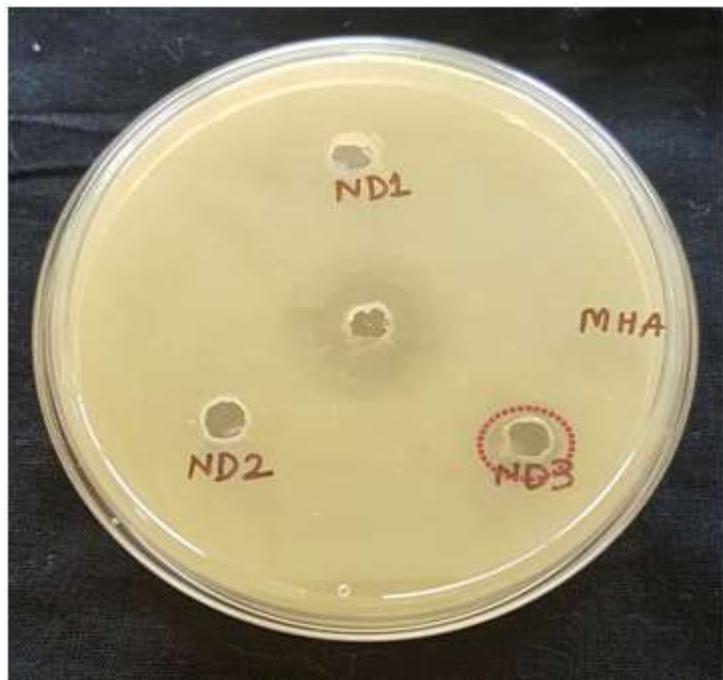


Figure S4: Antibacterial activity of atmospheric particulate matter (ND1) and derived carbon nanomaterials like wsCDs (ND2) and wsOLFs (ND3). The unmarked central well is positive control showing clear zone of inhibition. The particulate matter and synthesized wsCDs (20 μ l) do not inhibit the growth of bacterial strain. The synthesized wsOLFs (20 μ l) shows growth inhibition zone indicating the presence of antibacterial property.