Electronic Supplementary Material (ESI) for Analyst.

Supplementary information

Ultrasensitive multiwall carbon nanotube-mesoporous MCM-41 hybrid-based platform for the electrochemical detection of ascorbic acid

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# Equal contribution

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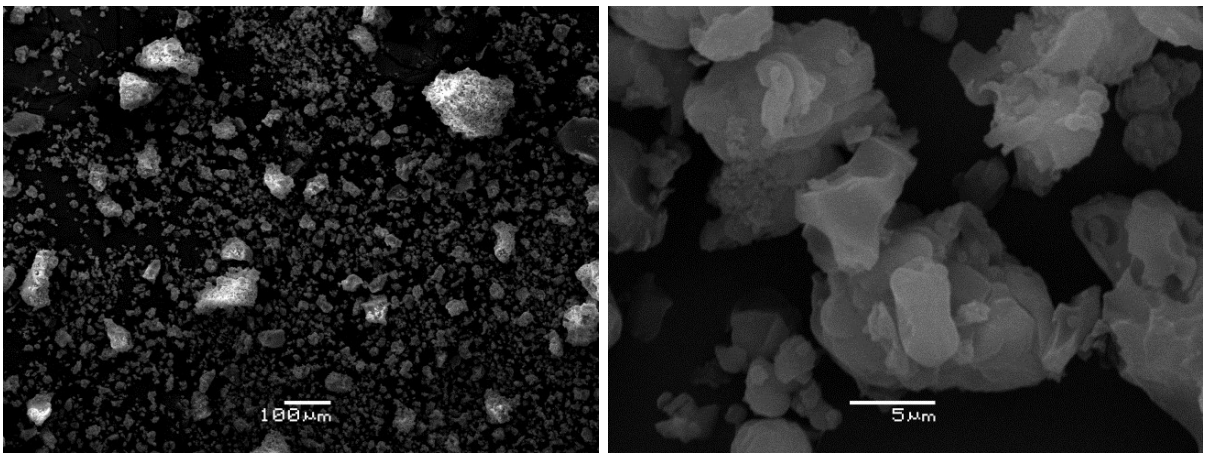

Fig. S1 SEM images of MCM-41 at two different magnifications.

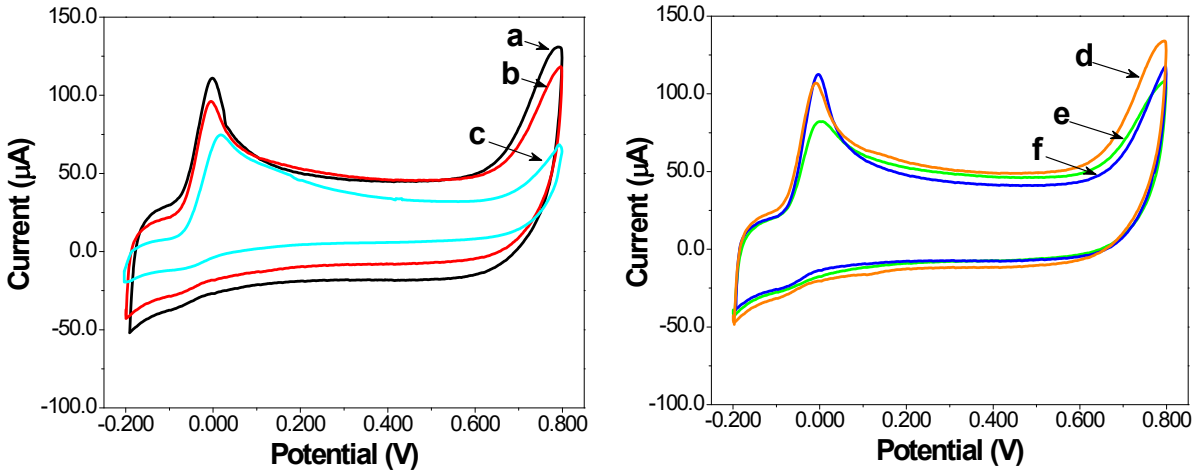

Fig. S2 Cyclic voltammograms for 1.00 x 10^{-3} M AA at GCE modified with 0.50 mg mL^{-1} MWCNTs/0.50 mg mL^{-1} MCM-41 hybrid prepared via dispersion in: **(a)** water, **(b)** DMF, **(c)** ethanol, **(d)** water/ethanol, **(e)** DMF/water, and **(f)** DMF/ethanol. Scan rate: 0.100 V s^{-1}. Supporting electrolyte: 0.050 M phosphate buffer pH 7.40.

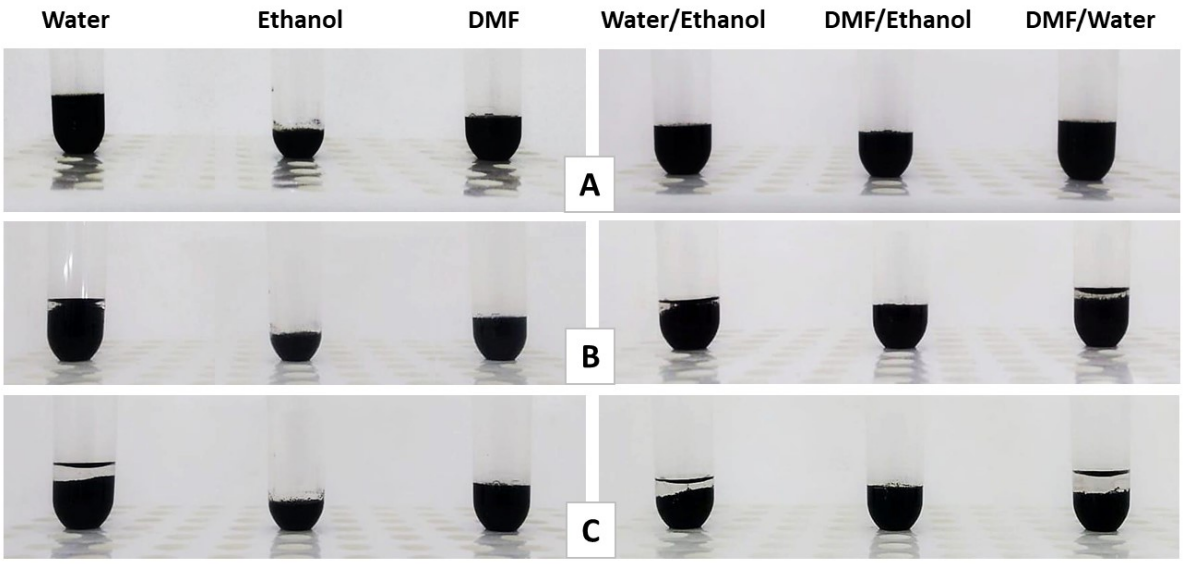

Fig. S3 Macroscopic stability of the 0.50 mg mL^{-1} MWCNTs/0.50 mg mL^{-1} MCM-41 hybrid in water, ethanol, DMF, water/ethanol, DMF/ethanol, and DMF/water. Images obtained immediately after preparation **(A)**, and after 15 min **(B)** or 24 h **(C)** stored at room temperature.

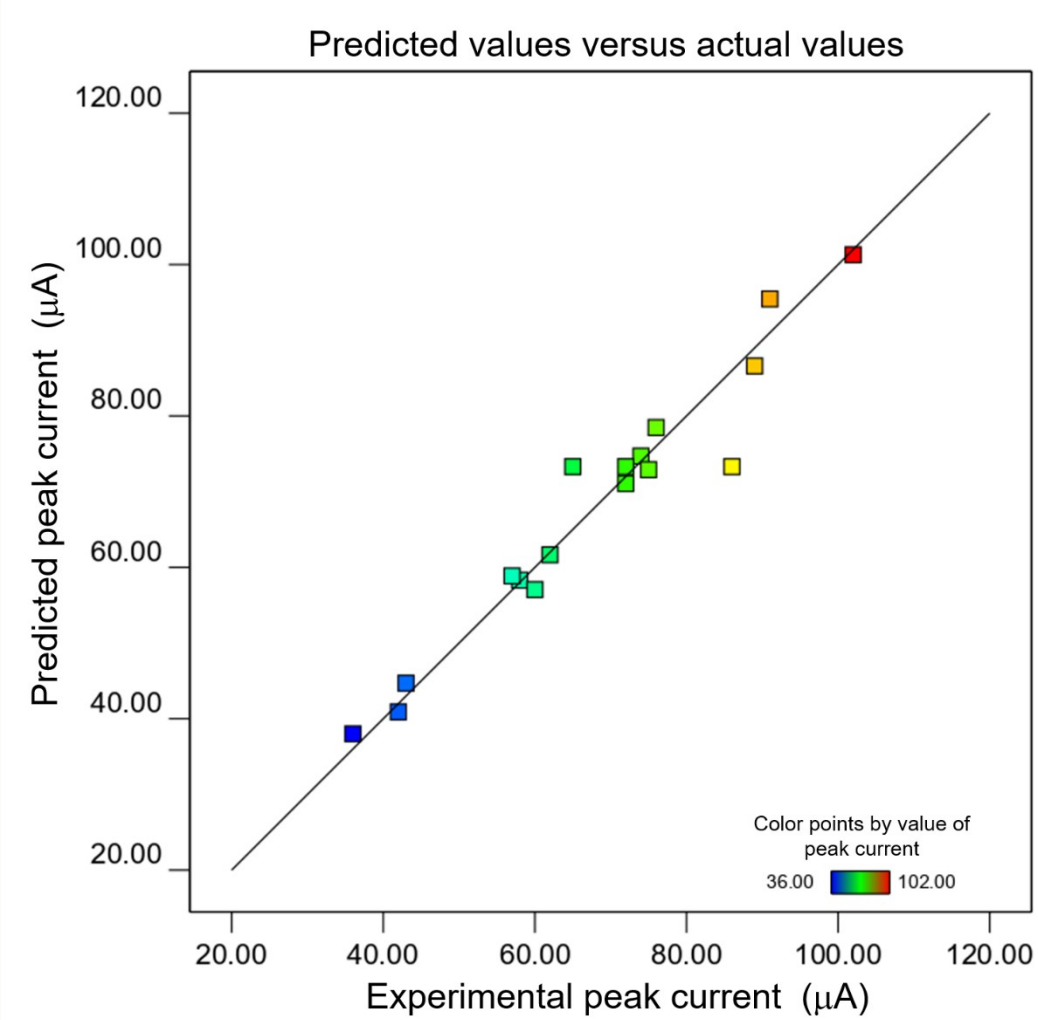

Fig. S4 Predicted values of the AA oxidation peak current versus experimental values from RSM design.

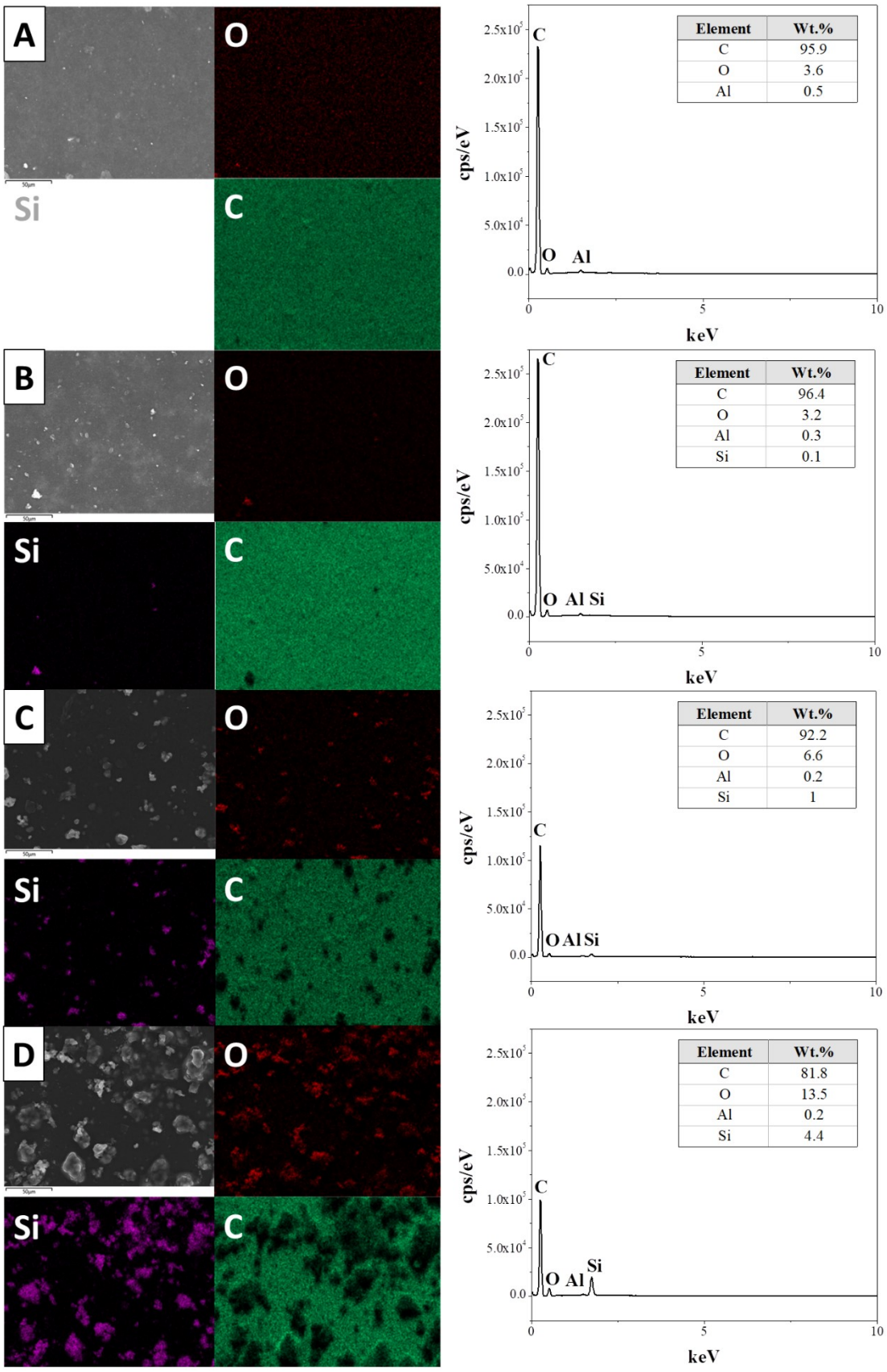

Fig. S5 SEM, elemental mapping for O, Si, and C, and EDX analysis of GCE modified with different MWCNT/MCM-41 hybrids in DMF. **(A)** 0.75 mg mL^{-1} MWCNTs; **(B)** 0.75 mg mL^{-1} MWCNTs/0.25 mg mL^{-1} MCM-41; **(C)** 0.75 mg mL^{-1} MWCNTs/0.50 mg mL^{-1} MCM-41; **(D)** 0.75 mg mL^{-1} MWCNTs/0.75 mg mL^{-1} MCM-41. Sonication time = 30 min.

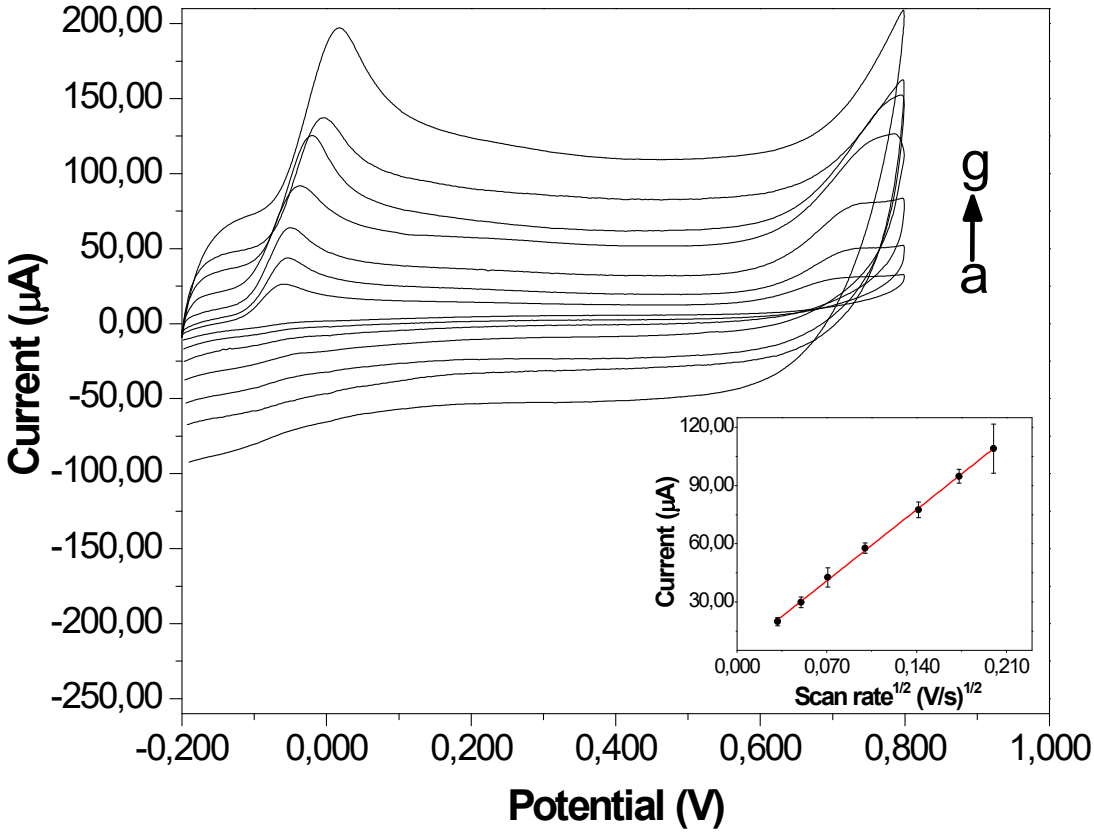

Fig. S6 Cyclic voltammetric response for 5.00 x 10^{-4} M AA in 0.050 M phosphate buffer solution pH 7.40 on GCE/MWCNT–MCM-41 at scan rates of (a) 0.010, (b) 0.025, (c) 0.050, (d) 0.100, (e) 0.200, (f) 0.300, and (g) 0.400 V s^{-1}. Inset displays plot of oxidation peak current versus square root of scan rate.

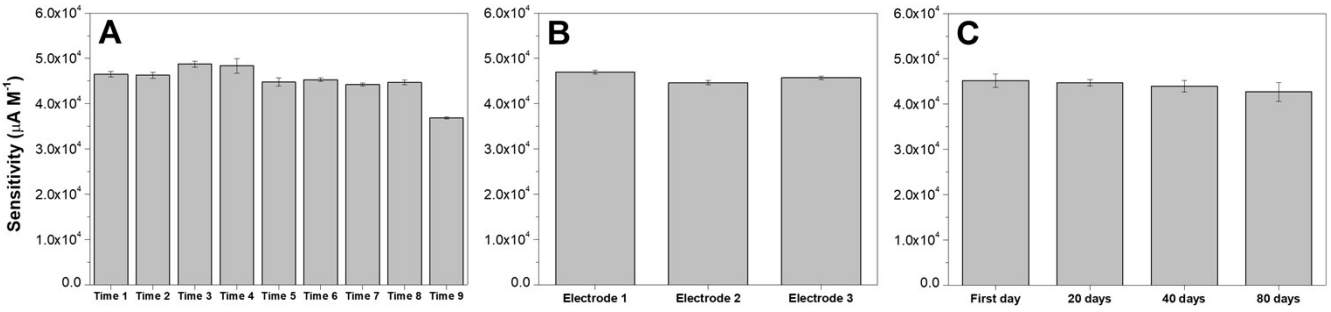

Fig. S7 Graphical representation of (A) repeatability, (B) reproducibility, and (C) stability of GCE/MWCNT–MCM-41 based on sensitivity towards AA obtained from amperometric experiments performed at 0.000 V in 0.050 M phosphate buffer solution pH = 7.40.