Supplementary Information

Facile fabrication of wood-derived porous Fe_3C/nitrogen-doped carbon membrane for colorimetric sensing of ascorbic acid

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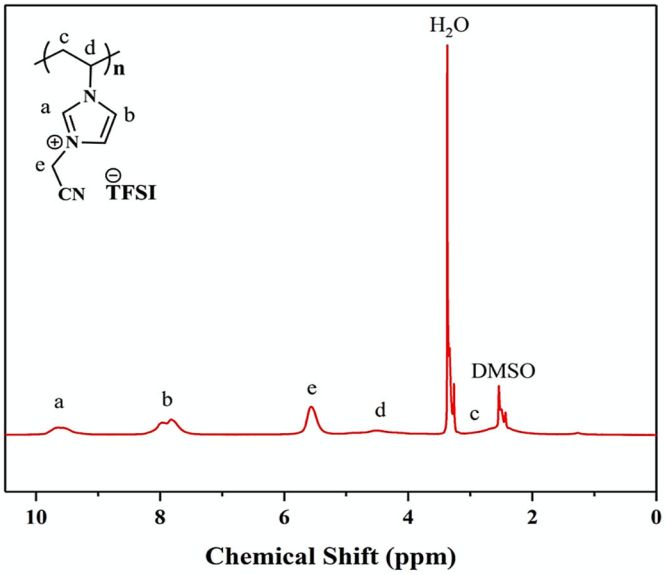

Figure S1 ^{1}H-NMR of the PIL poly(1-cyanomethyl-3-vinylimidazoluim bis(trifluoromethane sulfonyl)imide) (PCMVImTFSI), which was used for the porous membrane fabrication. NMR solvent: DMSO-*d*$_6$.

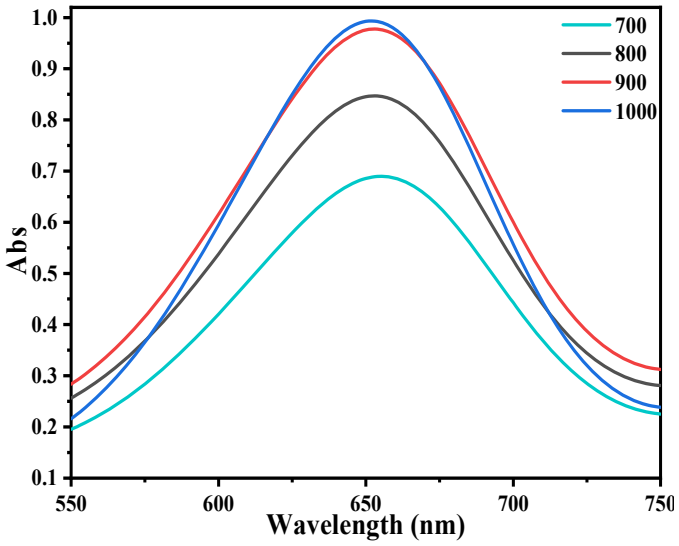

Figure S2 UV−Vis absorbance spectra of the ox-TMB recorded in three systems (TMB + H_2O_2 + Cat) prepared at different carbonization temperature, in acetate buffer solution at pH of 4.0.

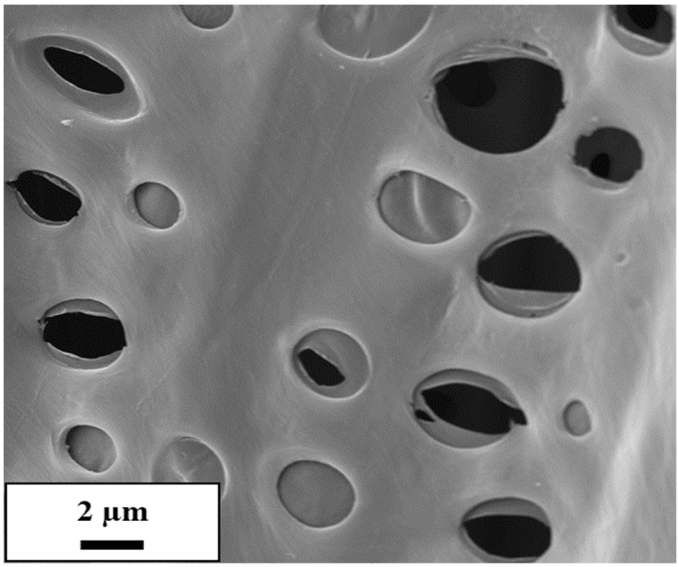

Figure S3 Cross-sectional SEM images of Fe_3C/N−C.

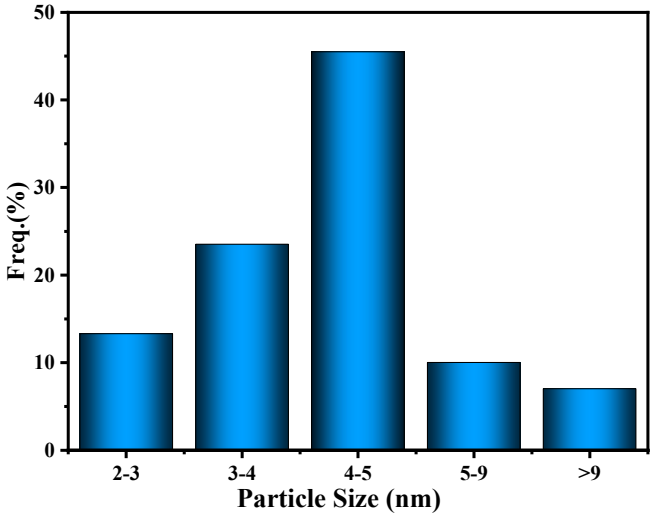

Figure S4 Nanoparticle size distribution of Fe_3C/N−C based on the TEM image in Figure 1.

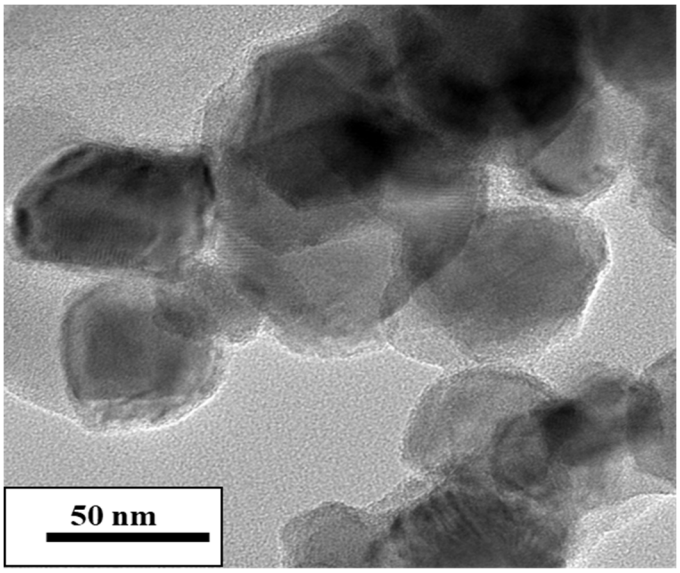

Figure S5 TEM image of Fe_3C-C when PIL wasn't used to disperse iron source and the agglomeration of big iron carbide particles was observed.

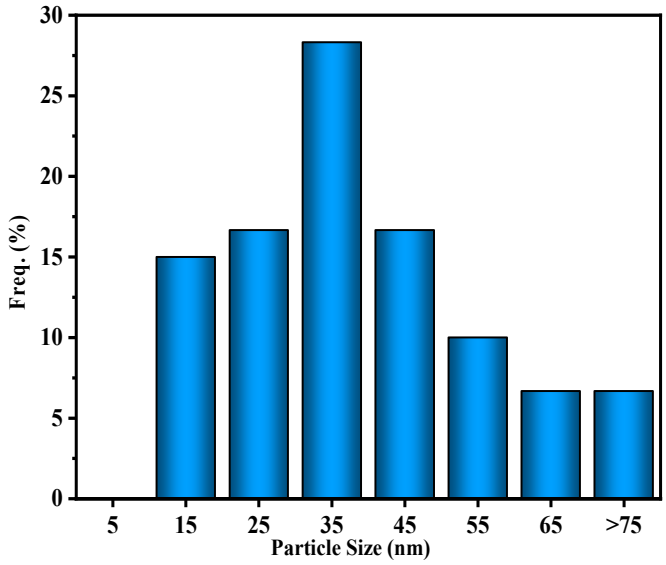

Figure S6 Particle size distribution of Fe_3C-C when PIL wasn't used to disperse iron source.

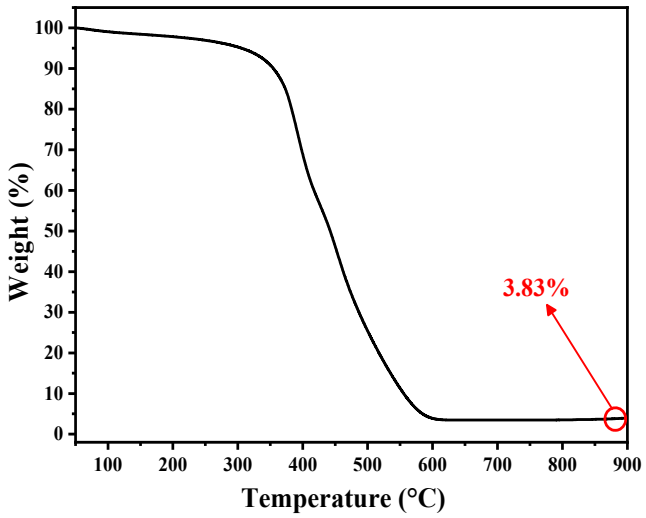

Figure S7 TGA curve of Fe_3C/N−C under air.

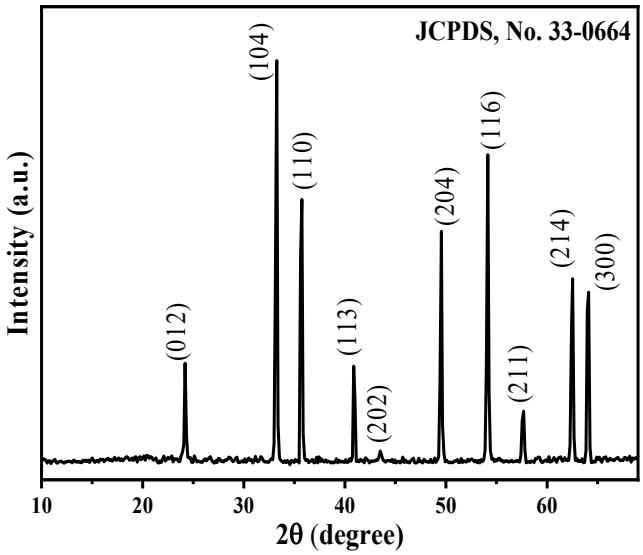

Figure S8 PXRD diagram of the TGA residue of Fe_3C/N−C after heating to 900 ºC in air, indicative of an α-Fe_2O_3 phase.

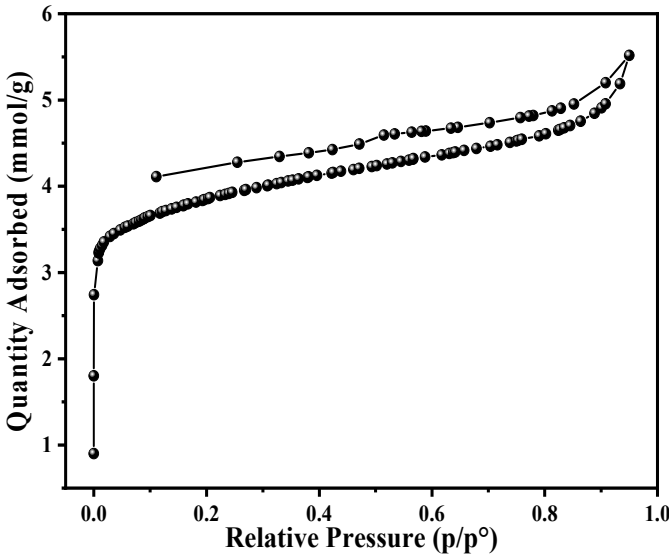

Figure S9 Nitrogen sorption isotherm of Fe_3C/N−C measured at 77 K.

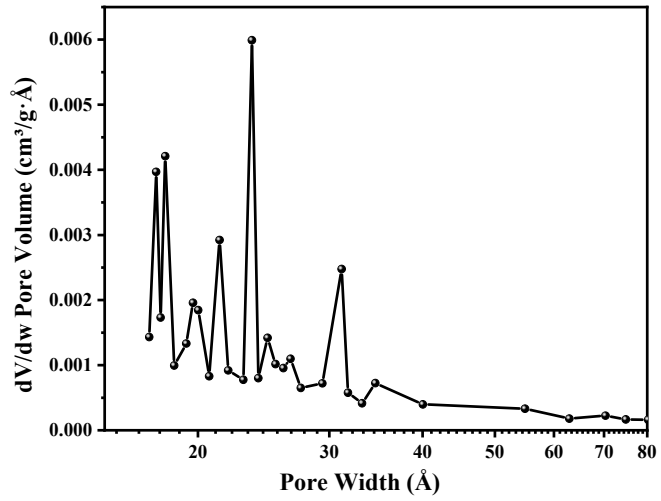

Figure S10 Pore size distribution plot of Fe_3C/N−C.

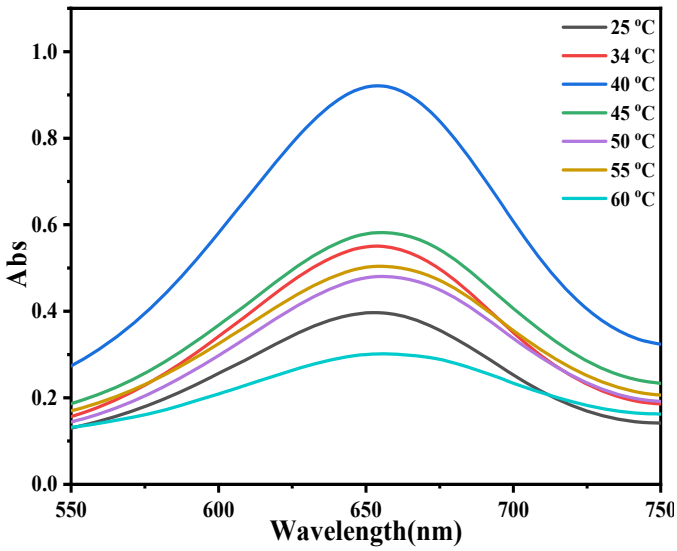

Figure S11 Temperature dependence plot of the peroxidase-like activity of the obtained Fe_3C/N−C catalyst.

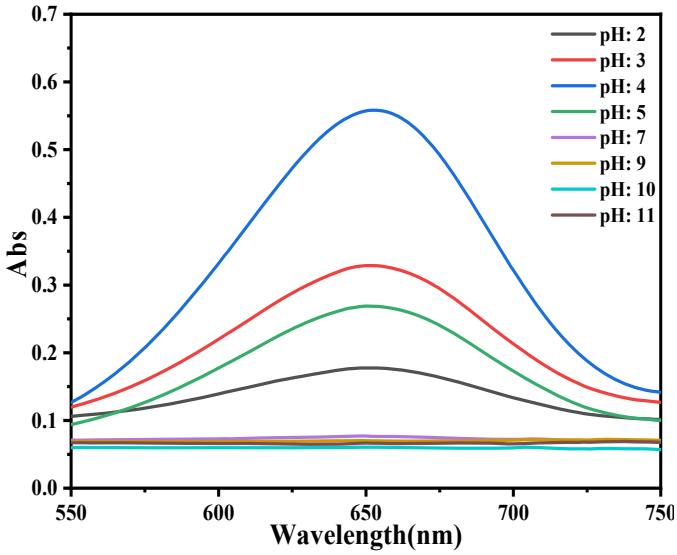

Figure S12 Dependence of the peroxidase-like activity of the obtained Fe_3C/N−C catalyst on pH.

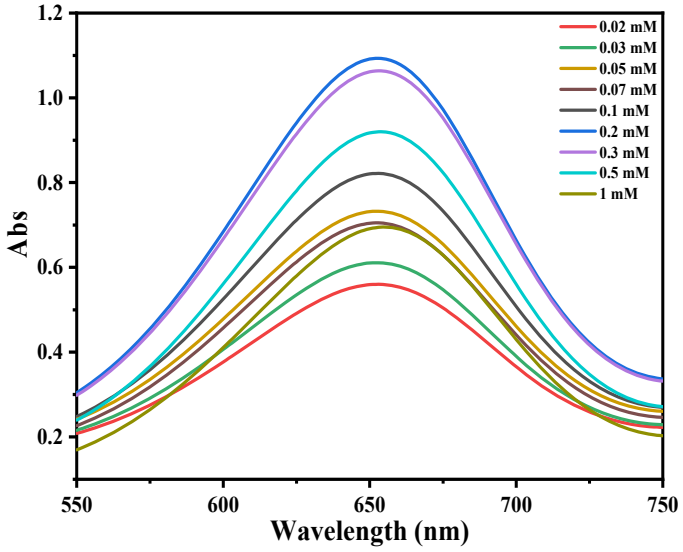

Figure S13 Dependence of the peroxidase-like activity of the obtained Fe_3C/N−C catalyst on TMB concentration.

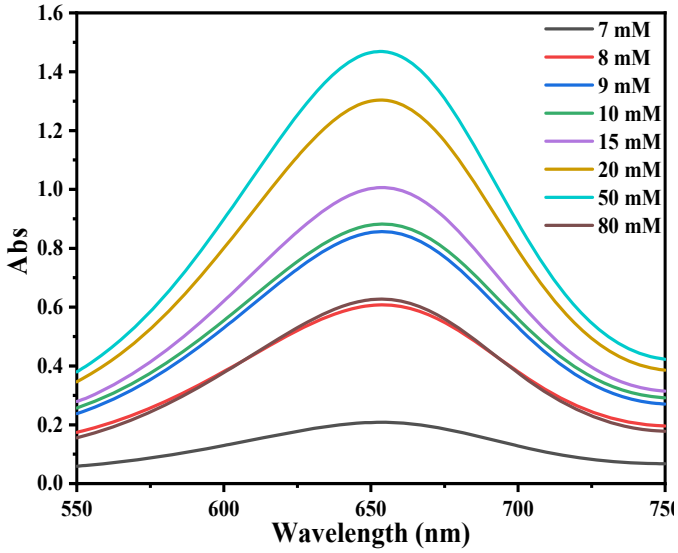

Figure S14 Dependence of the peroxidase-like activity of the obtained Fe_3C/N−C catalyst on H_2O_2 concentration

Table S1 Comparison of the apparent Michaelis constant (K_m) and maximum reaction rate (V_{max}) between our work and other groups' work.

Catalyst	Substrate	K_m (mM)	V_{max} (10^{-8} M s^{-1})	Reference
Fe_3O_4	TMB H_2O_2	0.098 154	3.44 9.78	[1]
Au/Co_3O_4-CeO_x NCs	TMB H_2O_2	0.1219 0.2724	0.8577 0.3898	[2]
WSe_2 nanosheets	TMB H_2O_2	0.433 19.53	1.43 2.22	[3]
Fe_3C/NGr	TMB H_2O_2	0.25 38.42	8.26 13.06	[4]
AKCN	TMB H_2O_2	0.60 0.79	6.78 2.53	[5]
HRP	TMB H_2O_2	0.41 0.74	1.12 1.11	[4]
Fe_3C/N-C	**TMB** **H_2O_2**	**0.033** **4.9**	**4.2** **3.84**	**This work**

Table S2 Analytical characteristics of different colorimetric AA measuring system.

Catalyst	LOD (μM)	Range	Reference
MOF-808	15	30-1030 μM	[6]
MIL-68	6	30-485 μM	[7]
MIL-53(Fe)	15	28.6-190.5 μM	[8]
CNT	20	80-136 μM	[9]
SQE	10	50-425 μM	[10]
Silver nanoparticles (AgNPs)	82.8	1-4 mM	[11]
MoO_3	90	1-100 mM	[12]
Fe_3C/N-C	**2.64**	**2-50 μM**	**This work**

References

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