**Supplementary Information**

# Hierarchically porous 2D carbon from bio-waste: A sustainable, rapid and efficient oxidase mimic for colorimetric detection of ascorbic acid

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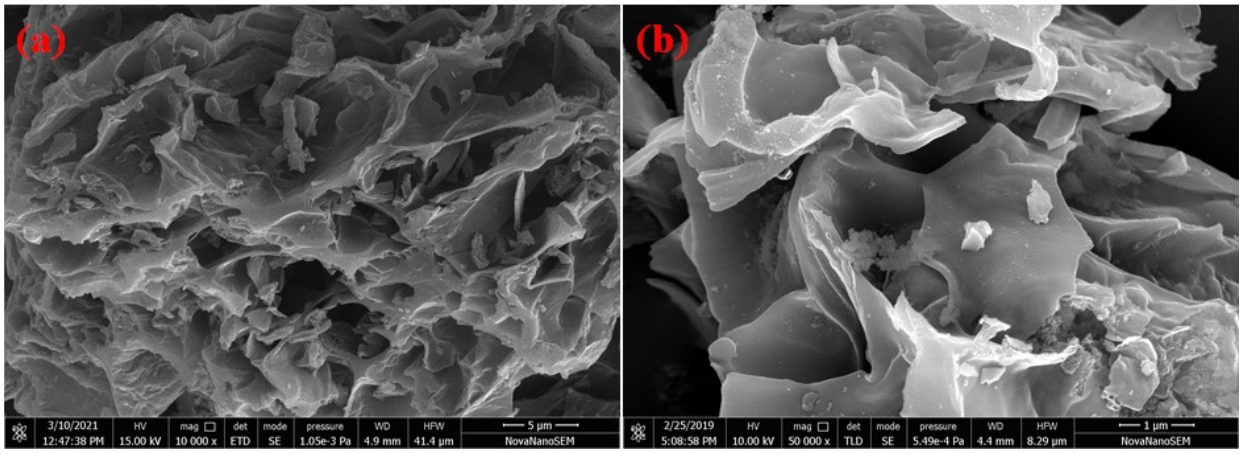


**Fig.S1.**SEM image of 2D carbon (a) at 5µm scale, (b) at 1µm Scale

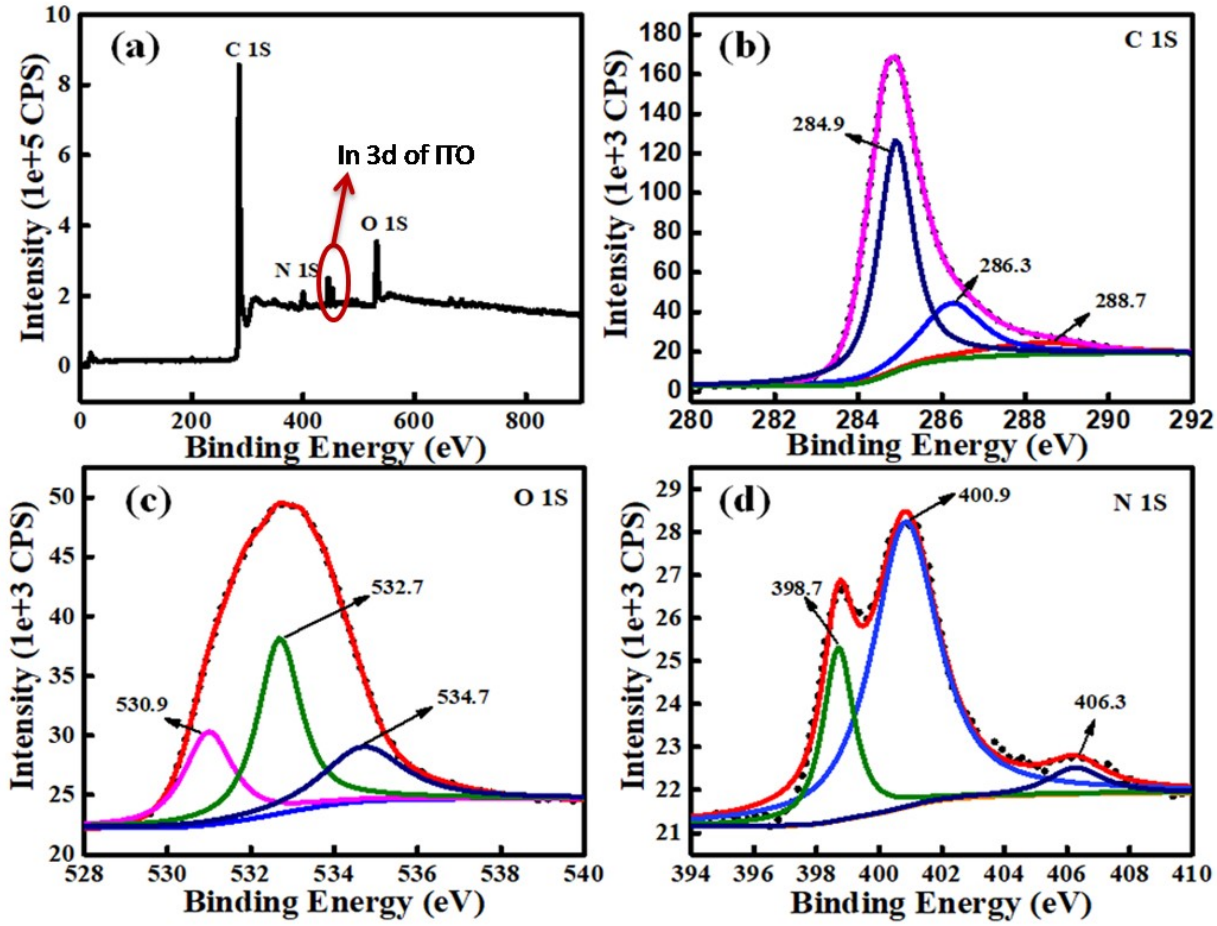


**Fig S2.** XPS study of 2Dcarbon (a) XPS survey spectrum, (b) Deconvoluted XPS spectra for C, (b) O, (c) N respectively. (Note-Here, ITO was used as substrate for XPS measurement, for which the peak appeared around (~450 eV) due to Indium element (In 3d)).

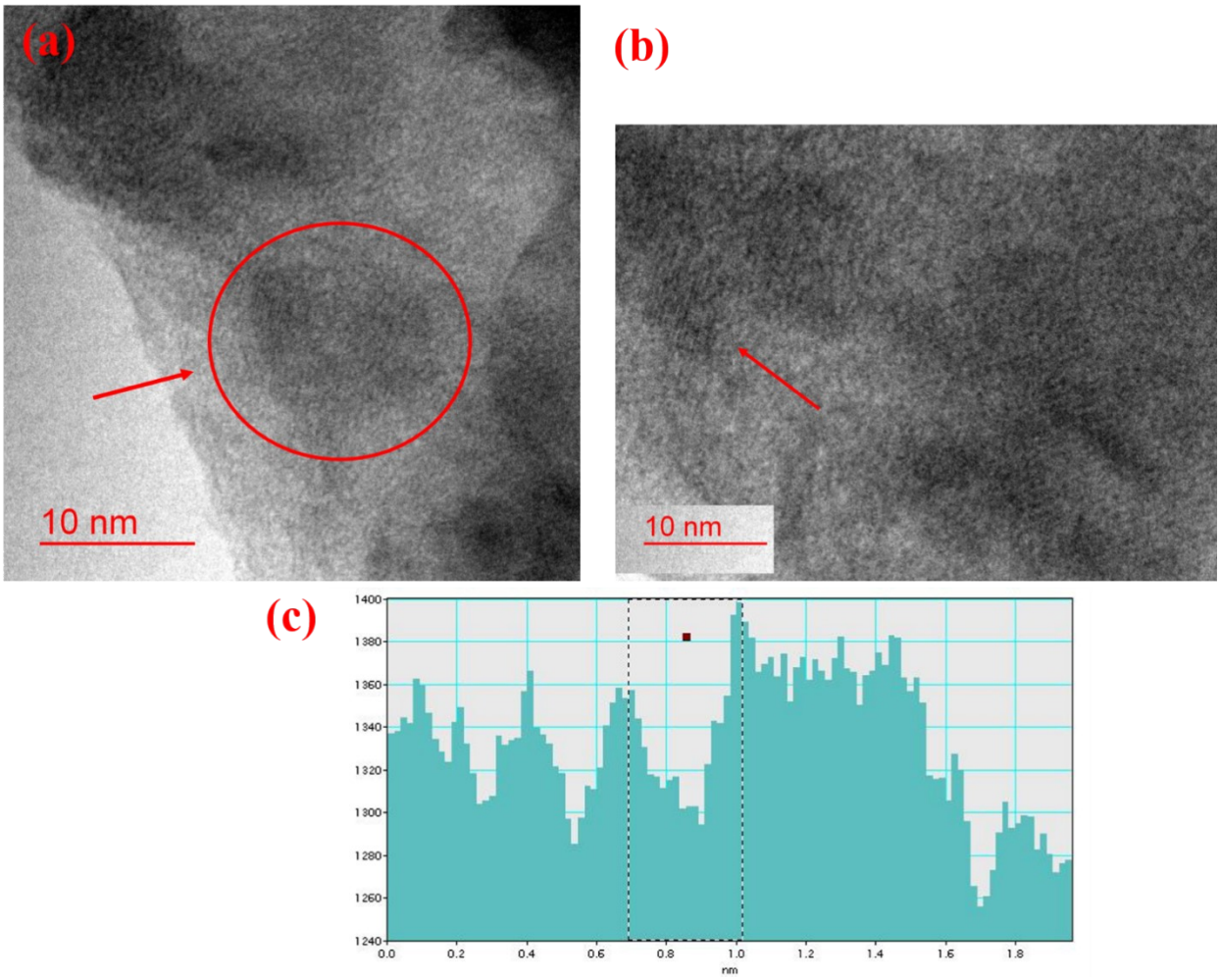


**Fig.S3.** (a) HR TEM image of 2D carbon at 10nm scale, (b) Enlarged image, (c) Interlayer d-Spacing

**Table S1:** Comparison of catalytic property of 2D carbon with other nanozymes.

| S. No. | Catalyst | Substrate | Km (mM) | Vmax ($MS^{-1}$) | Reference |
|---|---|---|---|---|---|
| 1 | 2D carbon | TMB | 0.122 | $5.3 \times 10^{-6}$ | This work |
| 2 | C-dots | TMB | 0.039 | $3.61 \times 10^{-8}$ | 1 |
| 3 | HRP | TMB | 0.434 | $10 \times 10^{-8}$ | 2 |
| 4 | N-GQDs | TMB | 11.19 | $0.38 \times 10^{-8}$ | 3 |
| 5 | Graphene-AuNPs | TMB | 0.38 | $18.30 \times 10^{-8}$ | 4 |

**Table S2.** Comparison table for the 2D carbon with other nanozymes.

| Material used | Method | LOD | Linear range | Reference |
|---|---|---|---|---|
| 2D carbon | Colorimetry | 0.26μM | 1- 70 μM | This work |
| AuNPs | Colorimetry | 0.3 μM | 1-15 μM | **5** |
| Cu/Ag/rGO | Colorimetry | 3.6μM | 1-30μM | **6** |
| MIL-68/MIL-100 | Colorimetry | 6μM | 30-485μM | **7** |
| $CuCo_2O_4$ Microspheres | Colorimetry | 0.57μM | 1.00–10.00 μM | **8** |
| $AgFKZSiW_{12}$/PPy | Colorimetry | 2.7 μM | 1 to 80 μM | **9** |
| $CuFKZP_2W_{18}$/PPy (15%) | Colorimetry | 0.627 μM | 5–100μM | **10** |

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