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Supporting Information

Oxidase-mimic activity of the nitrogen-doped Fe_3C@C composites

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Experimental Section

Preparation of PB cubes

PB nanocubes were prepared according to a previous literature.[1] Briefly, 38 g polyvinylpyrrolidone (PVP, K30) and 1.15 g $K_4Fe(CN)_6$ were dissolved in 500 mL of HCl solution (0.1 M) under magnetic stirring. When the solution became clear, the bottle was placed into an electric oven and heated at 80 ^oC for 24 h. The obtained blue product was filtered by using 0.45 μm nylon membrane and washed several times with deionized water and absolute ethanol, then dried in a vacuum oven at 60 ^oC for 12 h.

Preparation of Fe_3C microboxes

The as-prepared blue product was pyrolyzed in a horizontally tubular furnace in Ar atmosphere at 550 ^oC for 6 h. The heating rate was 2 ^oC min^{-1}. The as-prepared black product was treated with 0.50 M H_2SO_4 for 24 h to remove the α-Fe and iron oxides possibly generated during the pyrolysis process, then washed with deionized water for five times and dried at 60 ^oC overnight.

Apparatus

The crystalline phases of the products were determined using X-ray diffraction (XRD) (ARL XTRA, Thermo Electron Co.) with Cu Kα radiation. The morphologies of the products were observed using a field emission scanning electron microscopy (SEM, Supra 55, Zeiss, Oberkochen, Germany) and a field emission transmission electron microscopy (TEM, JEM-2100F, JEOL, Tokyo, Japan). Elemental compositions were analyzed using X-ray photoelectron spectroscopy (XPS) (AXIS ULTRA DLD, Kratos, SHIMADZU) with a monochromic Al Ka (1486.6 eV) as the X-ray source. UV-vis absorption spectra were recorded on a Shimadzu UV-1800 spectrometer.

References

[1] **L. Zhang, H. B. Wu, S. Madhavi, H. H. Hng, X. W. Lou, *Journal of the American Chemical Society* 2012, *134*, 17388.**

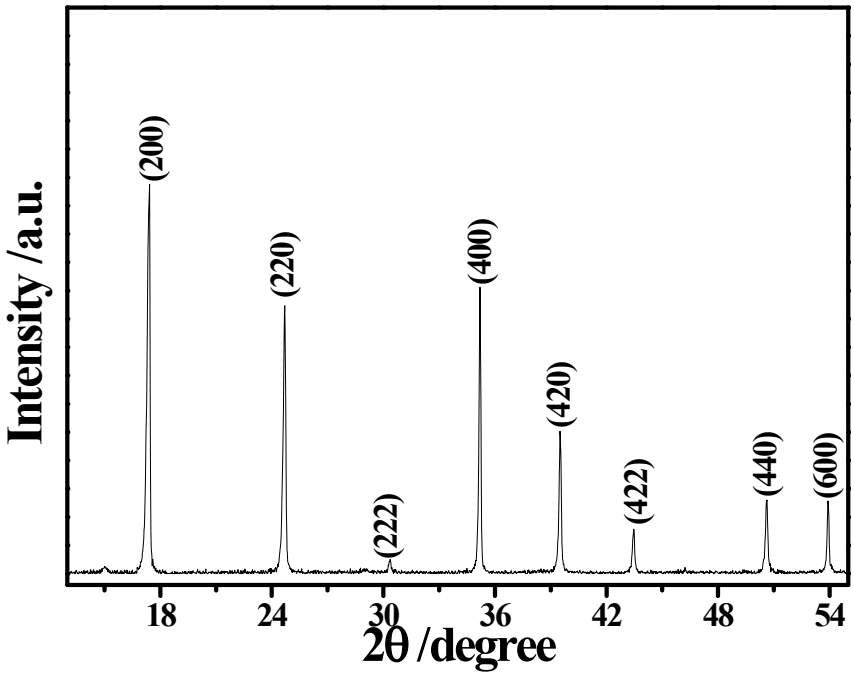

Figure S1. XRD pattern of the as-synthesized PB.

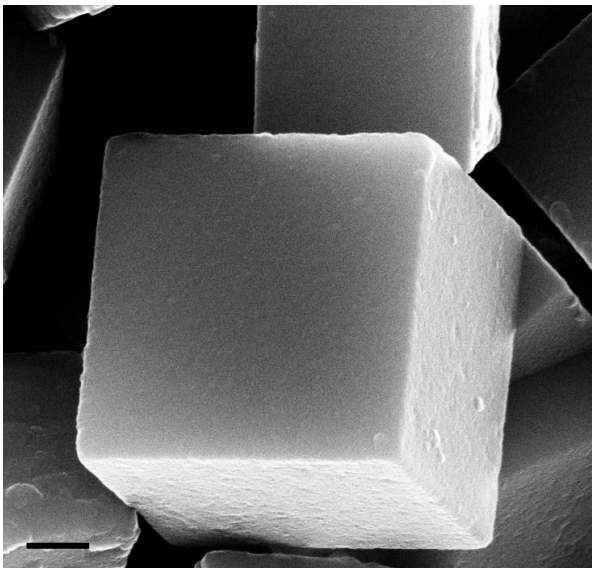

Figure S2. FE-SEM image of the as-synthesized PB. Scale bar: 200 nm.

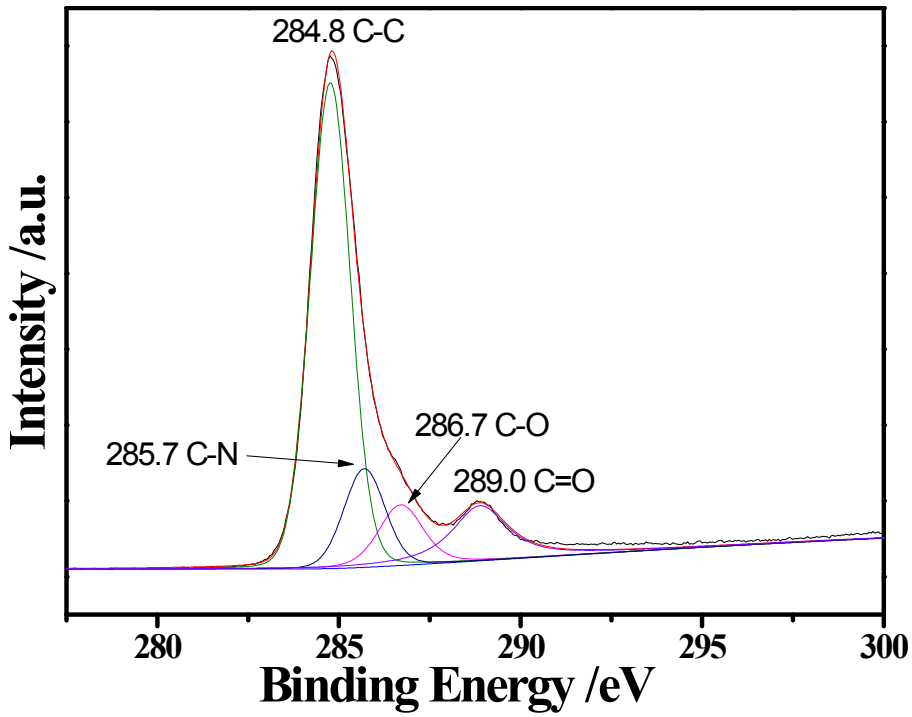

Figure S3. C1s spectrum of the N-doped Fe_3C@C composites together with their corresponding fits.

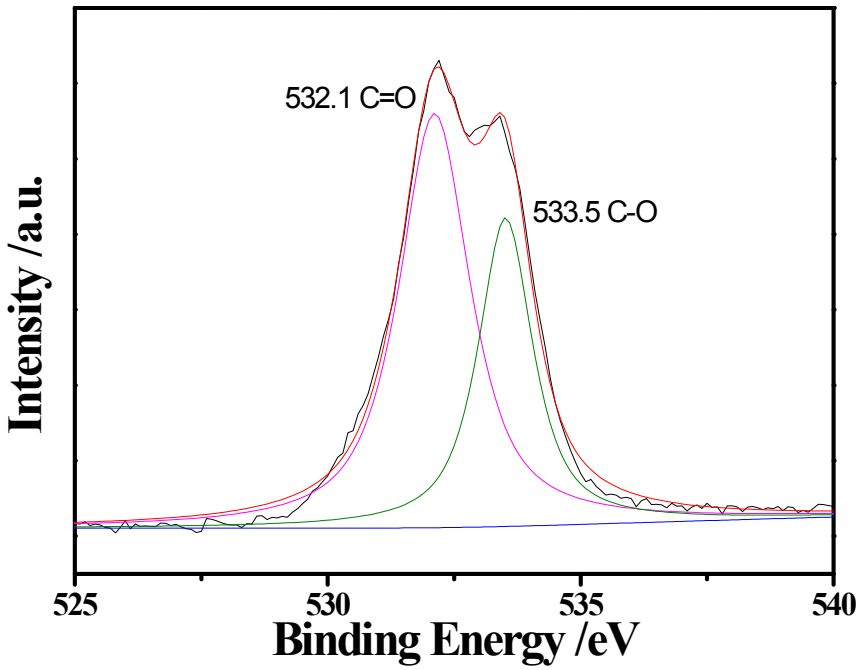

Figure S4. O1s spectrum of the N-doped Fe_3C@C composites together with their corresponding fits.