Supplementary Materials: Low-Cost Nanocarbon-Based Peroxidases from Graphite and Carbon Fibers

Yan Zeng, Feifan Miao, Zhiyong Zhao, Yuting Zhu, Tao Liu, Rongsheng Chen, Simin Liu, Zaosheng Lv and Feng Liang

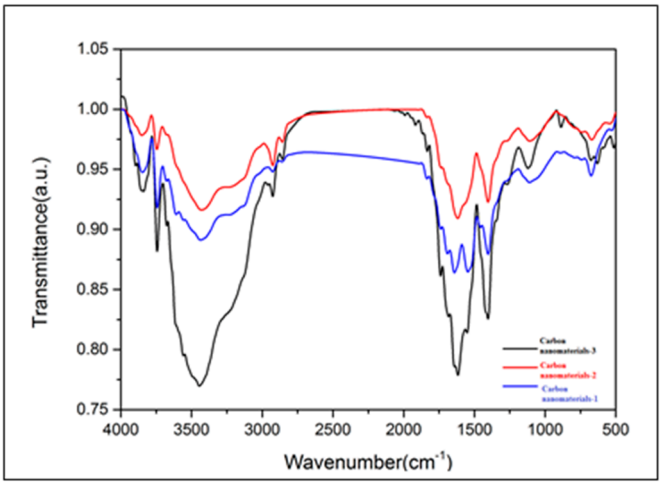

Figure S1. Fourier transform infrared spectroscopy (FT-IR) Spectrometer of as-synthesized carbon nanomaterials in this work. FTIR data analysis was performed on a FTIR spectrometer (VERTEX 70, Bruker, Bremen, Germany).

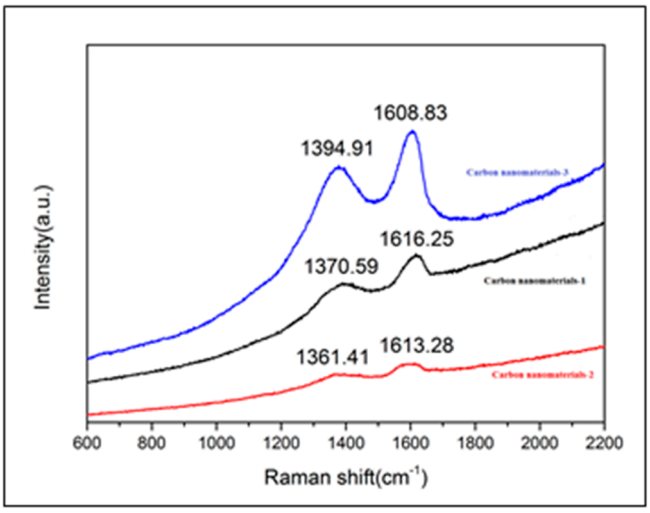

Figure S2. Raman spectra of as-synthesized carbon nanomaterials in this work. Raman spectra were acquired with INVIA plus Laser Raman Spectrometer (Renishaw, New Mills, UK).

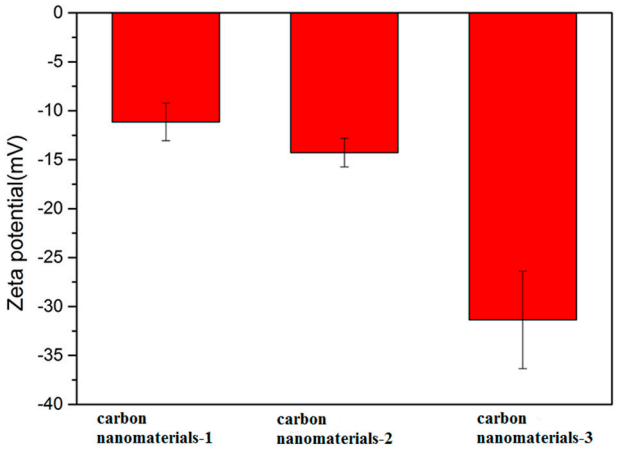

Figure S3. Zeta potential of as-synthesized carbon nanomaterials in this work. Zeta potential data were obtained from Zetasizer Nano-ZS ZEN3600 (Malvern, Worcestershire, UK).

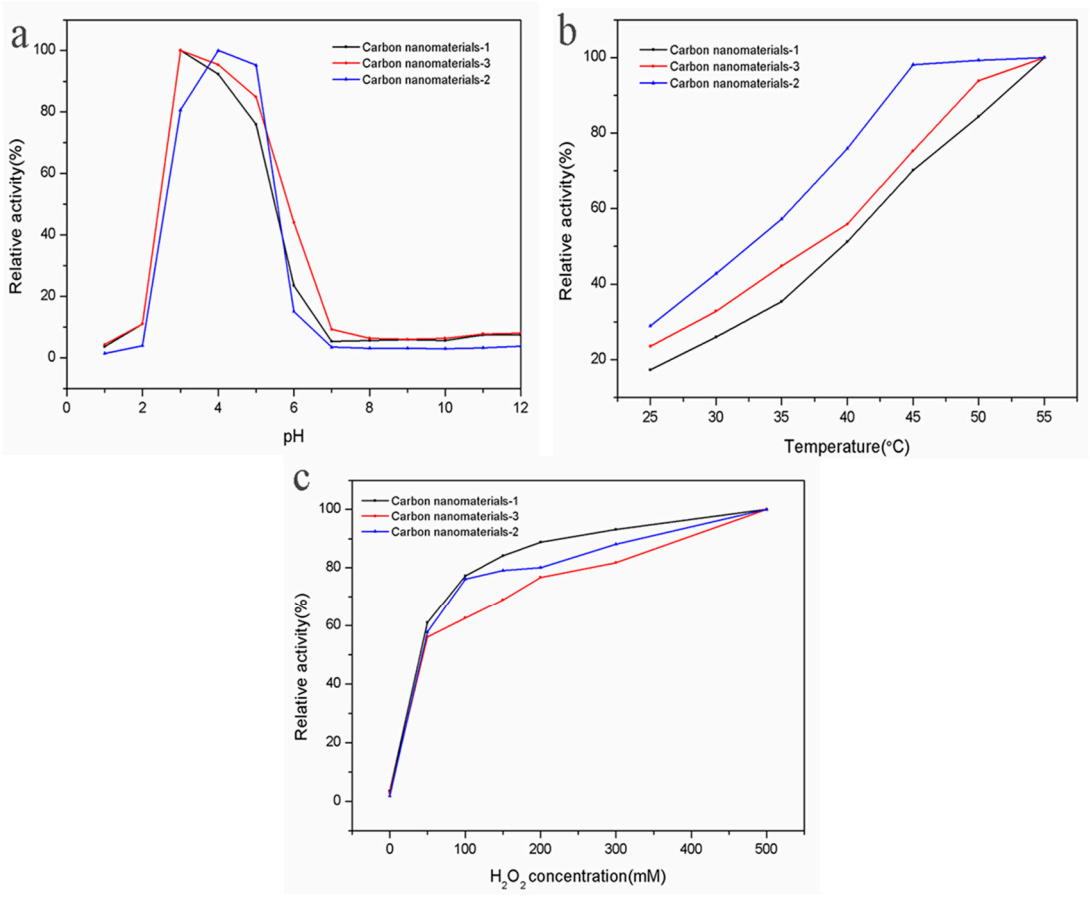

Figure S4. Effects of pH value, temperature and H_2O_2 concentrations on the peroxidase catalytic activities of different carbon nanomaterials. The reaction solution included 40 μg·mL^{-1} carbon nanomaterials, 800 μM TMB (3,3′,5,5′-Tetramethylbenzidine), 50 mM H_2O_2 (if fixed in a and b), and 25 mM phosphate buffer. The absorbance at 652 nm was recorded after 5 min incubation. The maximum point in each curve was set as 100%. (**a**) the pH value varied from 1 to 12; (**b**) temperature was changed from 25 °C to 55 °C; (**c**) the concentration of H_2O_2 varied from 0 to 500 mM.

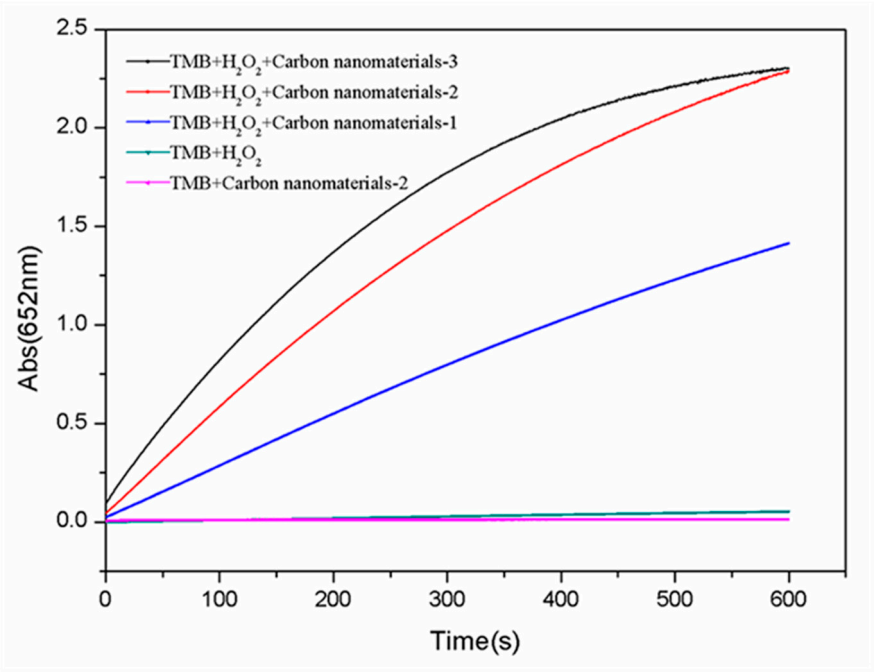

Figure S5. The time-dependent absorbance at 652 nm in the presence of 40 μg·mL^{-1} different carbon nanomaterials, 800 μM TMB and 50 mM H_2O_2 in 25 mM phosphate buffer (pH 4.0) at 35 °C.

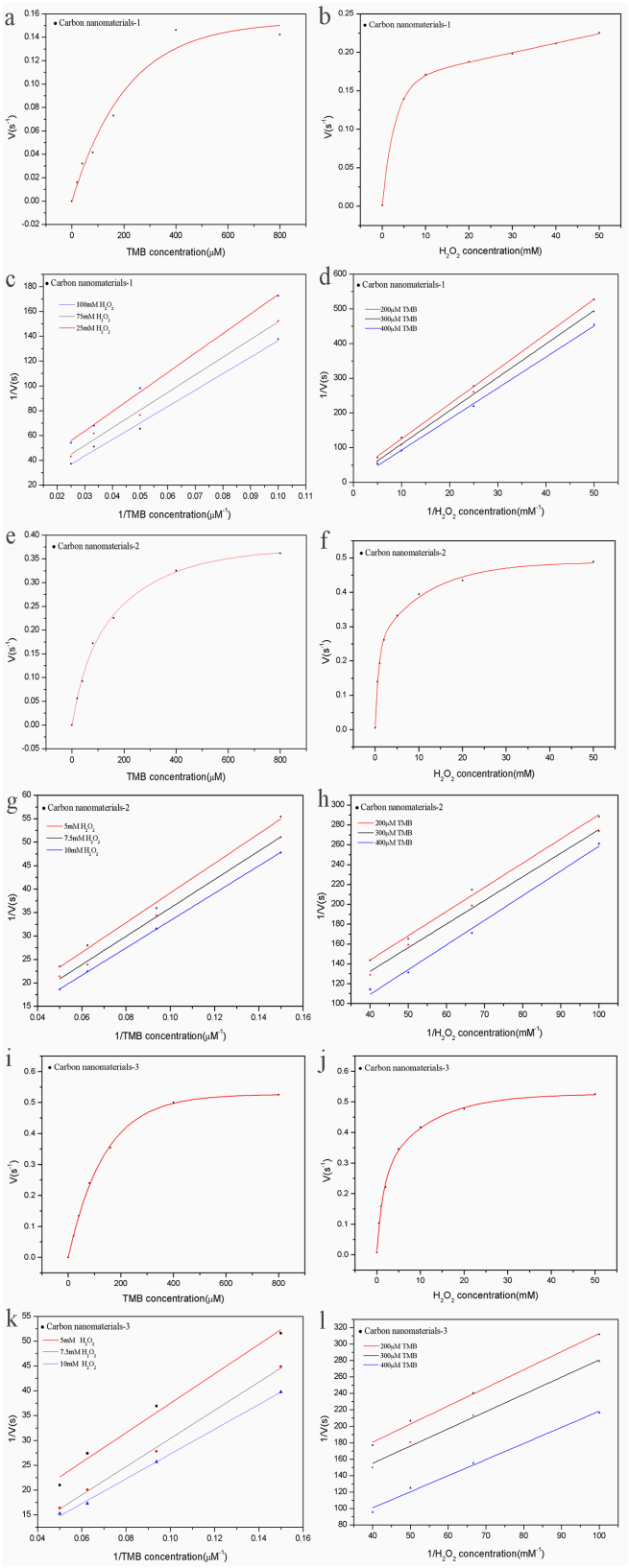

Figure S6. The kinetic behaviors for as-prepared carbon nanomaterials. The velocity of the reaction treated with 40 μg·mL^{-1} of carbon nanomaterials was measured in phosphate buffer (pH 4.0) at 35 °C. In (**a**), (**e**), (**i**), the concentration of H_2O_2 was fixed at 50 mM and the concentration of TMB was varied; in (**b**), (**f**), (**j**), the concentration of TMB was fixed at 800 μM and the concentration of H_2O_2 was varied; (**c**), (**g**), (**k**) and (**d**), (**h**), (**l**) double-reciprocal plots of the activity of carbon nanomaterials at a fixed concentration of one substrate versus different concentration of the second substrate for H_2O_2 or TMB. Each point is an average of three successive measurements.