Electronic Supplementary Information for In-situ synthesis of C-doped (BiO)₂CO₃ hierarchical selfassembly effectively promoting visible light photocatalysis

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Fig. S1 The crystal structure of (BiO)₂CO₃.



Fig. S2 Nitrogen adsorption-desorption isotherm (a) and pore size distribution (b) of the undoped $(BiO)_2CO_3$ and C-doped $(BiO)_2CO_3$.



Fig. S3 Nyquist plots for BOC and CBOC-M in aqueous solution in the dark and under visible light illumination.



Fig. S4 Room-temperature PL emission spectra of the two samples.



Fig. S5 Reaction rate constants k of the as-prepared samples.

The reaction rate constant k of BOC, CBOC-L, CBOC-M and CBOC-H is determined to be 0.078, 0.214, 0.231 and 0.185 min⁻¹, respectively. The apparent quantum efficiency¹ was defined as

$$\varphi_{x} = \frac{\mp (d[x]/dt)}{d[h\nu]_{\rm inc}/dt}$$

where d[x]/dt is the rate of change of the concentration of the reactant (or product) and d[hv] _{inc}/dt is the total optical power impinging on the sample. The average light intensity was 0.16 W·cm⁻². The apparent quantum efficiency of BOC, CBOC-L, CBOC-M and CBOC-H is determined to be 16.3, 45.5, 49.1 and 39.3%, respectively. Obviously, the C-doped (BiO)₂CO₃ samples exhibited higher reaction rate constant k and apparent quantum efficiency than BOC.

1 M. R. Hoffmann, S. T. Martin, W. Choi, and D. W. Bahnemann, *Chem. Rev.* 1995, **95**, 69-96.



Fig. S6 Photocatalytic activity of CBOC-M repeatedly prepared by the same method.



Fig. S7 XRD (a), SEM images (b), FT-IR spectra (c) and UV-vis DRS (d) of CBOC-

M after photocatalytic reactions.



Fig. S8 UV-vis DRS of C-doped $(BiO)_2CO_3$ samples with other carbohydrate compounds as carbon doping source.