

Supporting Information for

**Anionic Group Self-Doping as a Promising Strategy:
Band-Gap Engineering and Multi-Functional
Applications of High-Performance CO_3^{2-} Doped
 $\text{Bi}_2\text{O}_2\text{CO}_3$**

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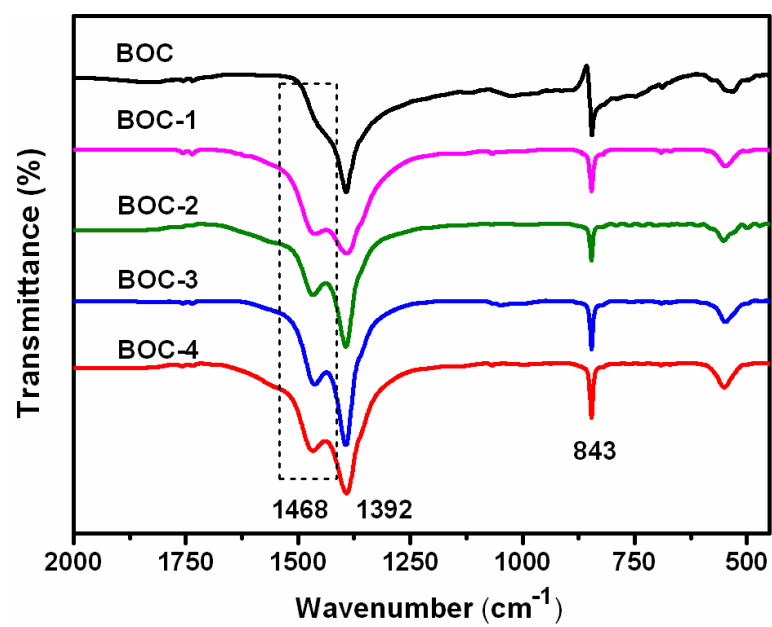


Figure S1. FTIR spectra of pristine BOC and C-BOC samples.

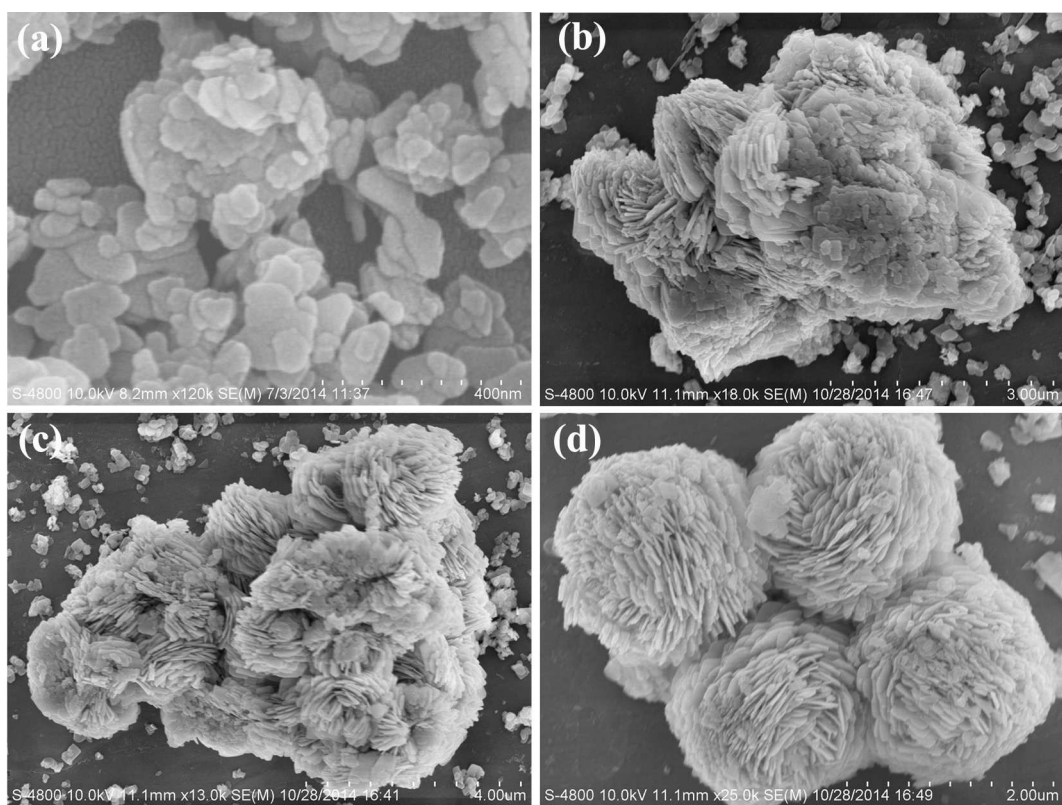


Figure S2. SEM images of (a) the pristine $\text{Bi}_2\text{O}_2\text{CO}_3$, (b) BOC-1, (c) BOC-2 and (d) BOC-4.

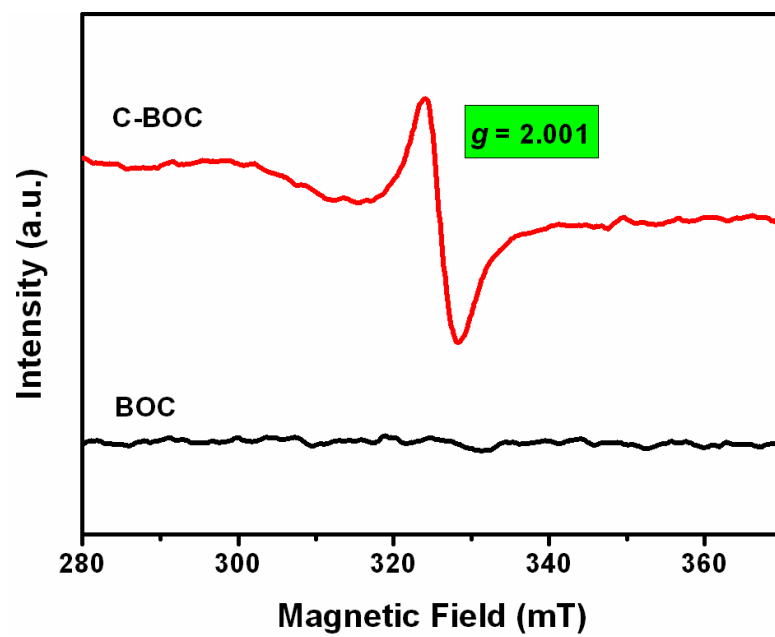


Figure S3. *In situ* EPR spectra of BOC and C-BOC (BOC-3).



Figure S4. Photo of carbon-doped $\text{Bi}_2\text{O}_2\text{CO}_3$ sample.

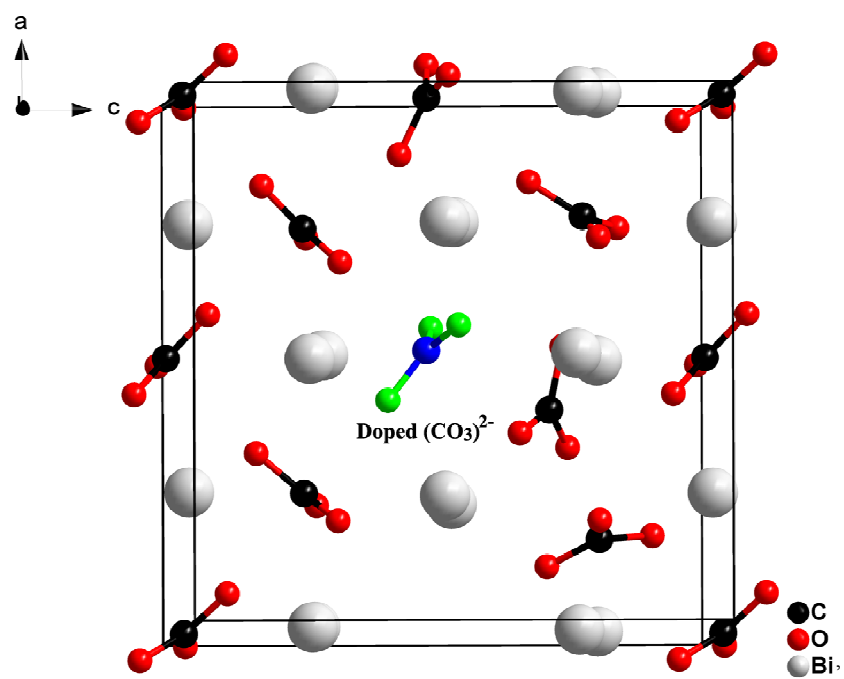


Figure S5. Arrangement of CO_3^{2-} ions in self-doped $\text{Bi}_2\text{O}_2\text{CO}_3$.

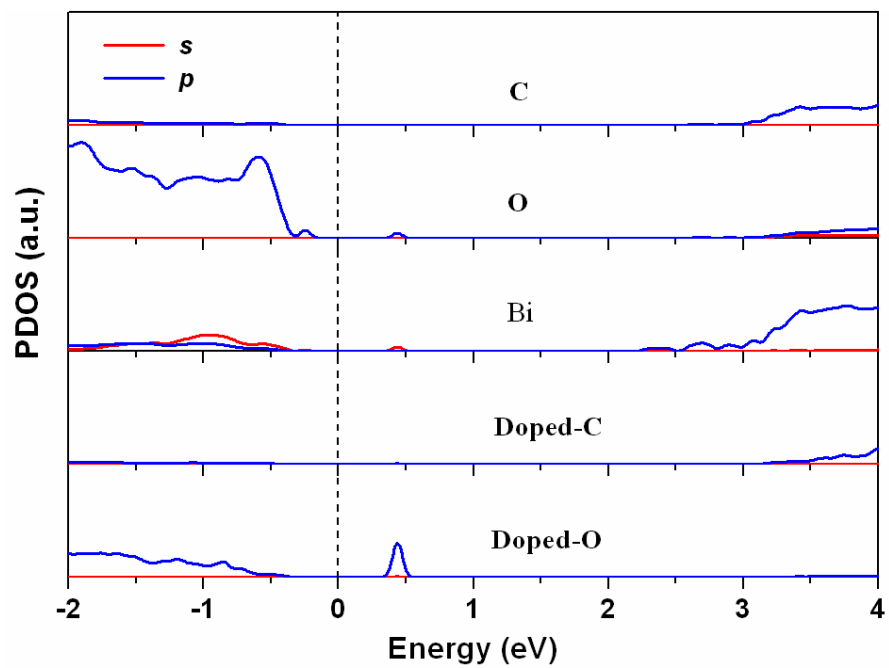


Figure S6. PDOS of CO_3^{2-} self-doped $\text{Bi}_2\text{O}_2\text{CO}_3$ sample.

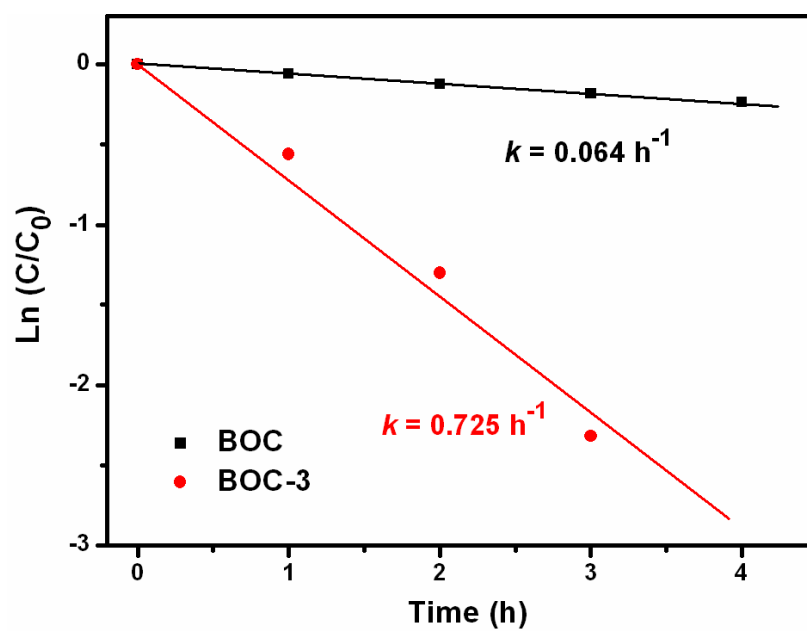


Figure S7. The first-order kinetics photodegradation curves of BPA by BOC and BOC-3 under simulated solar light illumination.

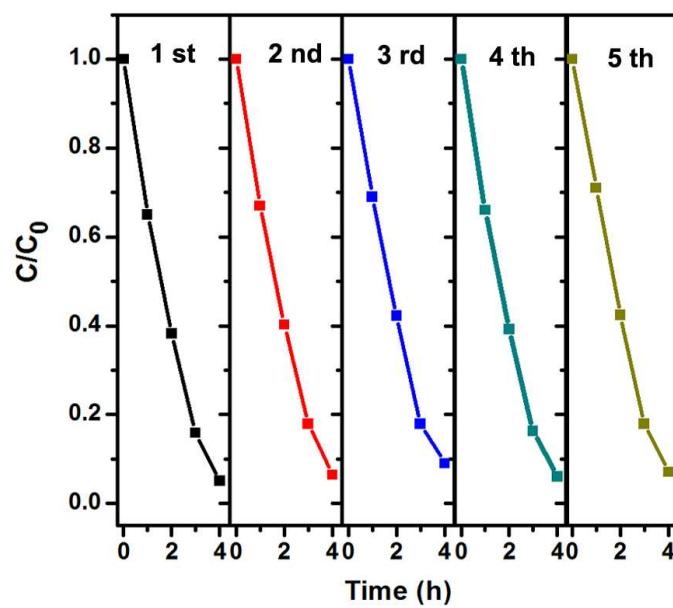


Figure S8. Recycling test for photodegradation of BPA under visible light ($\lambda > 420$ nm).

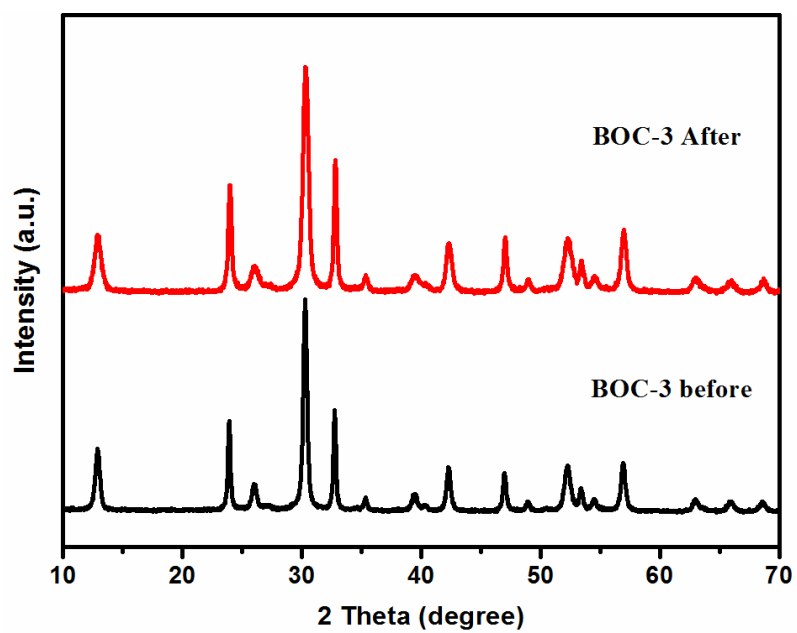


Figure S9. XRD patterns of BOC-3 sample before and after irradiation.