Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A

Supporting Information

Monodispersed Ag nanoparticles loaded on the PVP-assisted synthetic $Bi_2O_2CO_3$ microspheres with enhanced photocatalytic and supercapacitive pPerformances

Shengjie Peng,[*a] Linlin Li,[a,b] Huiteng Tan,[a] Yongzhi Wu,[c,d] Ren Cai,[a] Hong Yu,[a,b] Xin Huang,[a] Peining Zhu,[d] Seeram Ramakrishna,[d] Madhavi Srinivasan,[a,b] and Qingyu Yan[*a,b]

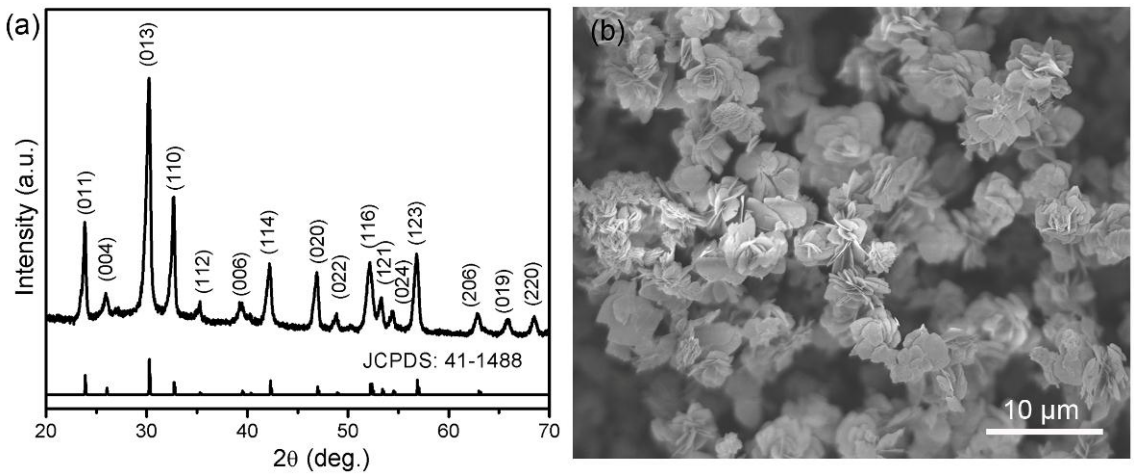

Fig. S1 XRD pattern and SEM image of the $Bi_2O_2CO_3$-3 by using Na_2CO_3 as the precursor.

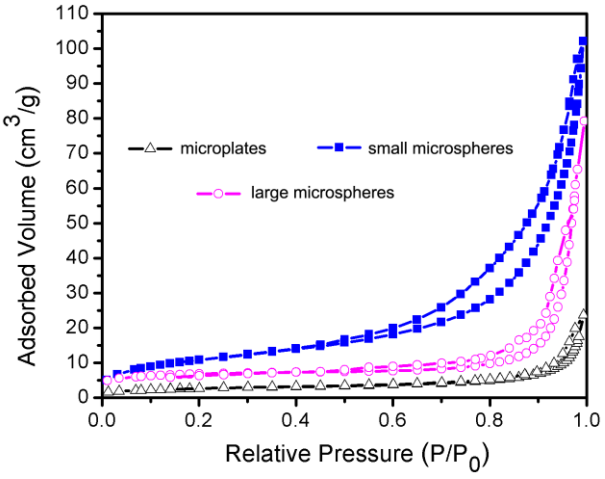

Fig. S2 Nitrogen adsorption–desorption isotherm and the corresponding pore size distribution (inset) of $Bi_2O_2CO_3$-1, $Bi_2O_2CO_3$-2 and $Bi_2O_2CO_3$-3, respectively.

The Brunauer–Emmett–Teller (BET) surface areas of $Bi_2O_2CO_3$−1, $Bi_2O_2CO_3$−2 and $Bi_2O_2CO_3$−3 calculated from N_2 isotherms are 45.8, 29.3 and 8.9 $m^2\ g^{-1}$, respectively.

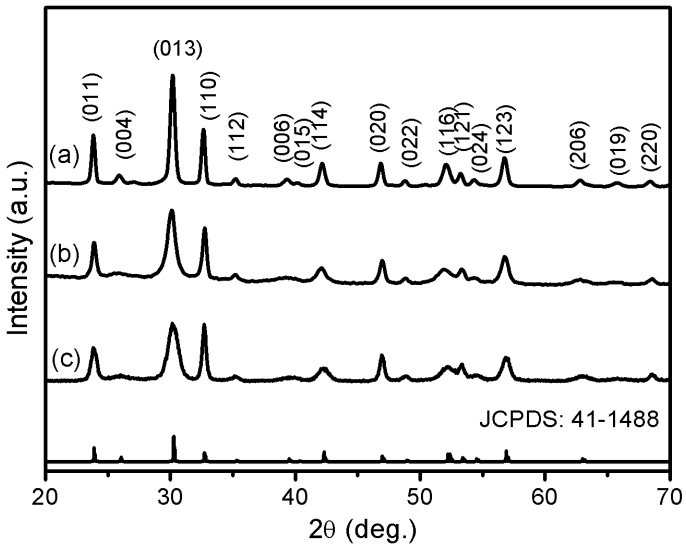

Fig. S3 XRD patterns of samples using different amounts of PVP: 0.2 g (a), 0.4 g (b), and 0.6 g (c), respectively.

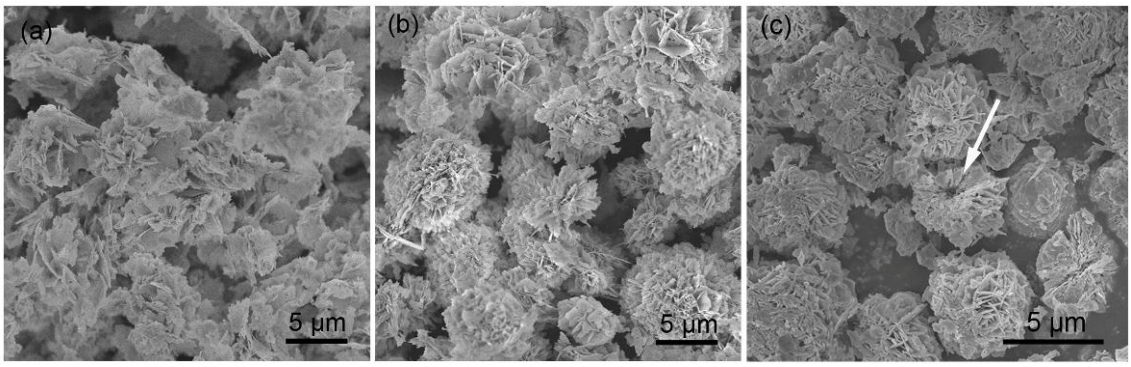

Fig. S4 SEM images of samples using different amounts of PVP: 0.2 g (a), 0.4 g (b), and 0.6 g (c), respectively.

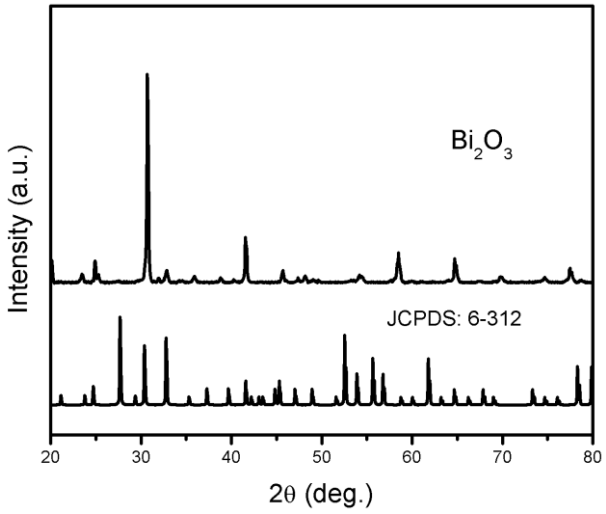

Fig. S5 XRD pattern of the product obtained in the absence of PVP and only using 0.9 g of HMT.

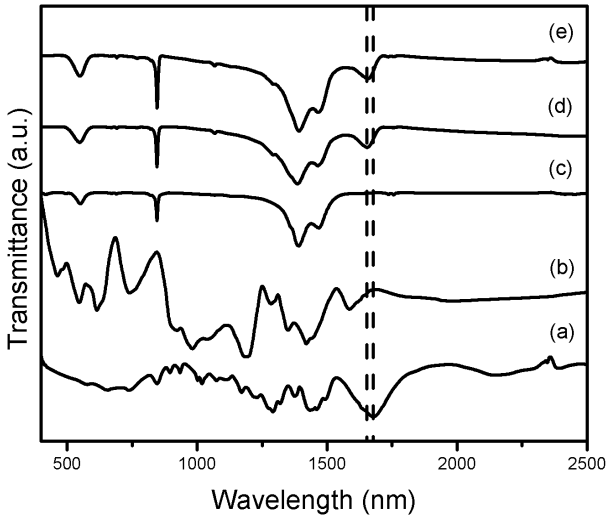

Fig. S6 IR spectra of the PVP (a), PVP/$Bi(NO_3)_3$ (b), $Bi_2O_2CO_3$−3 (c), $Bi_2O_2CO_3$−2 (d) $Bi_2O_2CO_3$−1 (e), respectively.

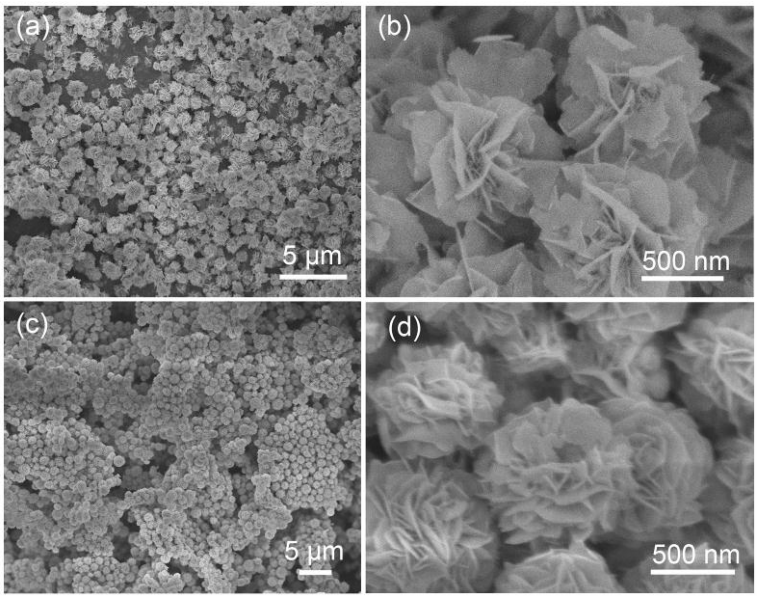

Fig. S7 SEM images of $Bi_2O_2CO_3$−1 obtained through different times: 30 min (a,b), and 4 h (c, d), respectively.

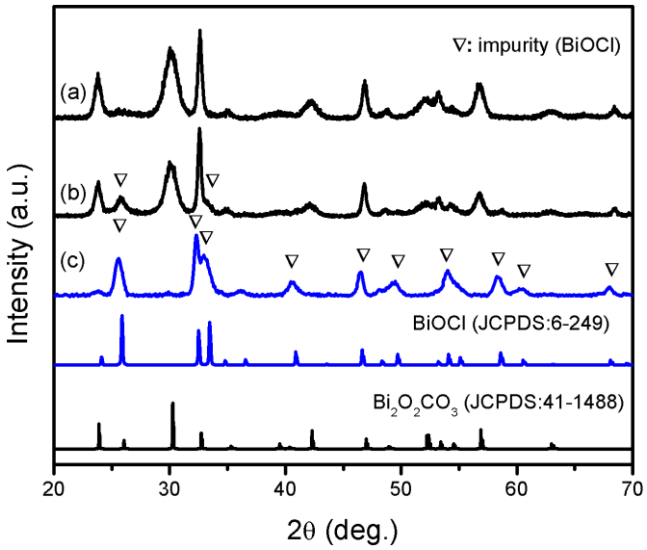

Fig. S8 XRD patterns of the products obtained by using 0.04 g (a), 0.06 g (b) and 0.2 g (c) of KCl, respectively.

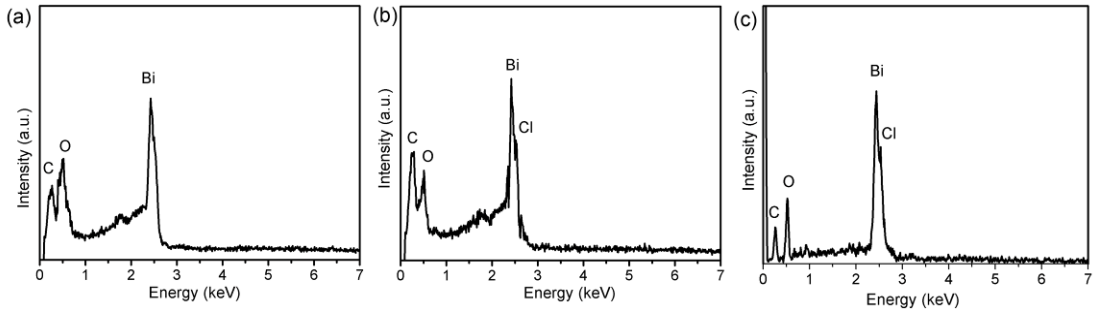

Fig. S9 EDS spectra of the products obtained by using 0.04 g (a), 0.06 g (b) and 0.2 g (c) of KCl, respectively.

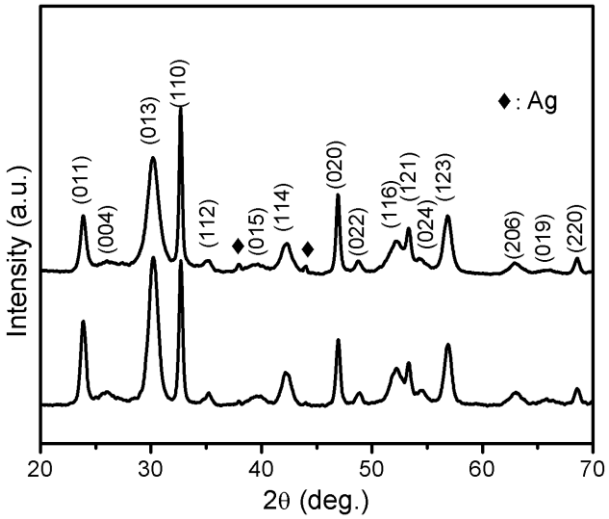

Fig. S10 XRD pattern of Ag(0.3%)/$Bi_2O_2CO_3$−1 and Ag(0.9%)/$Bi_2O_2CO_3$−1, respectively.

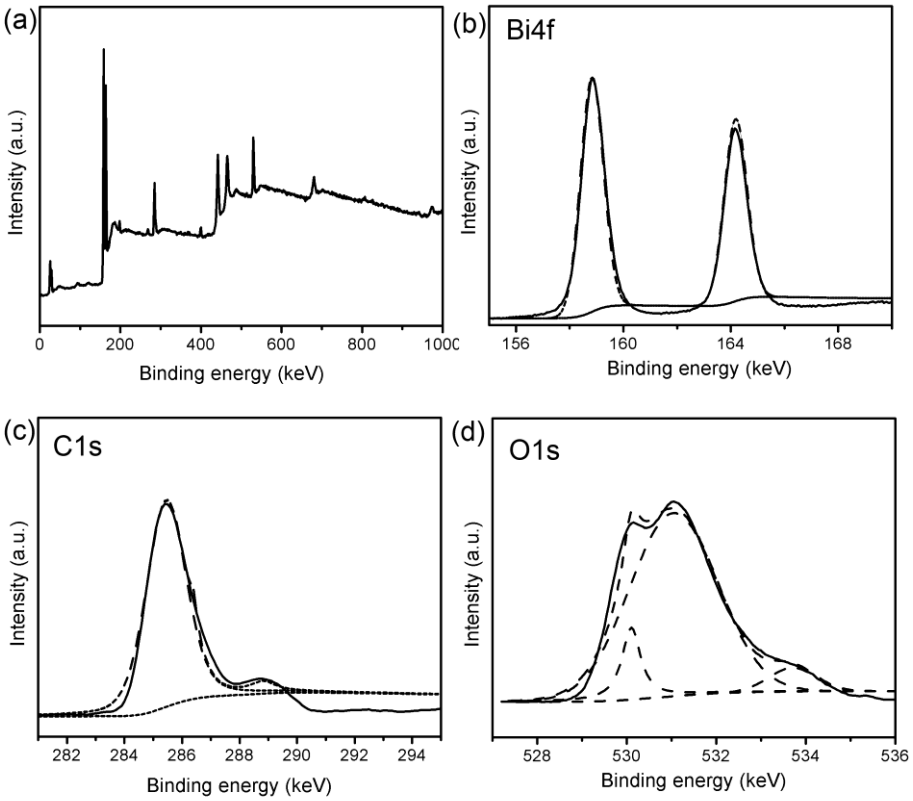

Fig. S11 XPS spectrum of the obtained Ag(0.6%)/$Bi_2O_2CO_3$−1: survey XPS spectrum (a), high-resolution Bi 4f (b), C 1s (c), and O 1s (d) spectrum.

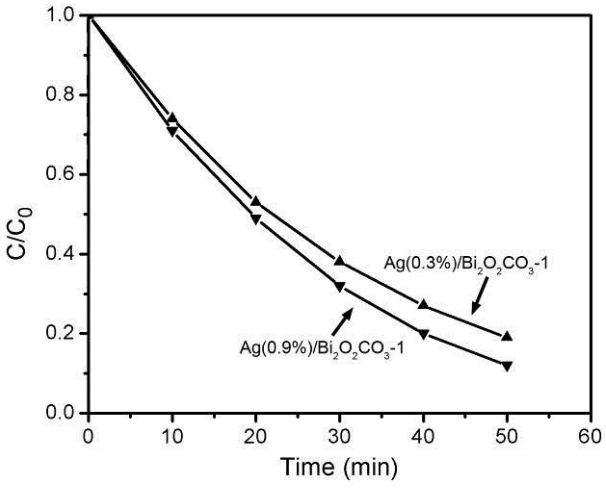

Fig. S12 Time-dependent absorption spectra of MO photocatalytic degradation with Ag(0.3%)/$Bi_2O_2CO_3$−1 and Ag(0.9%)/$Bi_2O_2CO_3$−1, respectively.

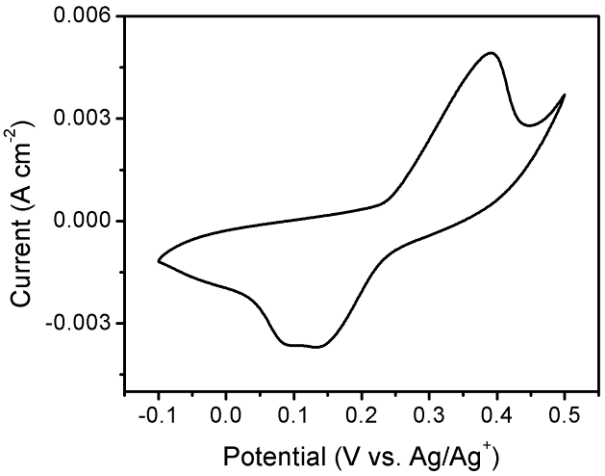

Fig. S13 The CV curves of Ni foam without loading of $Bi_2O_2CO_3$ at 50 mV s^{-1}.

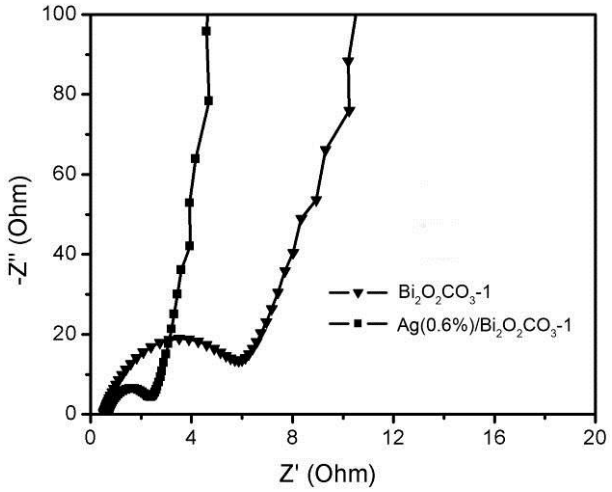

Fig. S14 Nyquist plots of the EIS for the $Bi_2O_2CO_3$−1, Ag(0.6%)/$Bi_2O_2CO_3$−1.

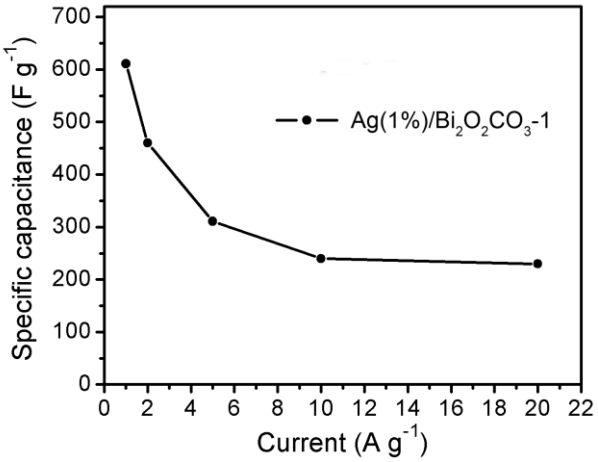

Fig. S15 Specific capacitance as a function of current densities for Ag(1%)/$Bi_2O_2CO_3$−1.