Supplementary Information

Hierarchically triangular prism structured Co$_3$O$_4$: Self-supported fabrication and photocatalytic property

Jiahui Kou$^a$, Christina Bennett-Stamper$^b$ and Rajender S. Varma$^{a*}$

$^a$ Sustainable Technology Division, $^b$ Water Supply Water Resources Division, National Risk Management Research Laboratory, U.S. Environmental Protection Agency, 26 West Martin Luther King Drive, MS 443, Cincinnati, Ohio 45268, USA

Email: Varma.Rajender@epa.gov

Experimental:

The phase purity crystal structures of as-synthesized samples were detected by an X–ray diffractometer (XRD) (Xpert, Pro, Holland). The morphology was examined by transmission electron microscopy (TEM) (JEOL, JEM-2100, Japan), scanned electron microscopy (SEM) (JEOL, JSM-6490LV, Japan), and field emission scanned electron microscopy (FESEM) (JEOL, JSM-7600F, Japan). The surface area was analyzed using the surface area and porosity analyzer (Tri-star 3000, Micromeritics, U.S.A.) by nitrogen adsorption at 77 K using the Brunauer-Emmett-Teller (BET) method. The concentration of oxidized products from isopropanol (IPA) was detected by the gas chromatograph-mass spectrometry (GC-MS, Agilent 6890N/5973I, USA). The quantification of production was based on the external standard and the use of calibration curve.
Fig. 1  Low magnification SEM image of triangular prism

Fig. S2  SEM image – ammonia (1 mL)

Fig. S3  SEM image – ammonia (5 mL)
Fig. S4  SEM image – ammonia (20 mL)

500 nm

Fig. S5  SEM image of as-synthesized sample in the absence of Na₃PO₄

Fig. S6  SEM image – molar ratio Na₃PO₄:Co(Ac)₂ (1:1)
Fig. S7  SEM image – molar ratio Na₃PO₄:Co(Ac)₂ (1.8:1)

Fig. S8  Low magnification SEM image of trunk-like sample

Fig. S9  SEM image – Using 0.1 mol NaOH
Fig. S10  SEM image – Using 0.2 mol NaOH

Fig. S11  TEM image of a typical triangular prism Co$_3$O$_4$

Fig. S12  Morphology of NH$_4$CoPO$_4$
Fig. S13  XRD patterns of Co$_3$O$_4$ at different calcination conditions