Supplemental Material

S1. Synthetic Procedures

*MnO$_2$-C (control reaction).* MnSO$_4$·H$_2$O (0.254 g, 1.5 mmol) was dissolved in 25 mL of water with stirring. Separately, KMnO$_4$ (0.158 g, 1.0 mmol) was also dissolved in 25 mL of water. The KMnO$_4$ solution was added to the MnSO$_4$ solution with vigorous stirring, resulting in the immediate formation of a brown precipitate. After stirring for 15 minutes, the solid was isolated by filtration through a medium porosity glass frit, washed thoroughly with water three times, and dried at 110 °C.

*MnO$_2$-AA.* The procedure for MnO$_2$-C was carried out, with the inclusion of 1.43 mL (25 mmol) of acetic acid being added to the MnSO$_4$ solution and an additional 50 mL of water being added to the stirred precipitate slurry prior to filtration.

*MnO$_2$-PA.* The procedure for MnO$_2$-C was carried out, with the inclusion of 1.87 mL (25 mmol) of propionic acid being added to the MnSO$_4$ solution and an additional 50 mL of water being added to the stirred precipitate slurry prior to filtration.

*MnO$_2$-BA.* The procedure for MnO$_2$-C was carried out, with the inclusion of 2.28 mL (25 mmol) of butyric acid being added to the MnSO$_4$ solution and an additional 50 mL of water being added to the stirred precipitate slurry prior to filtration.

S2. TEM image of MnO$_2$-BA hollow shell fragment
S3. Additional TEM images of MnO$_2$-C, MnO$_2$-AA, MnO$_2$-PA, and MnO$_2$-BA.
S4. XRD patterns of MnO$_2$-C, MnO$_2$-AA, MnO$_2$-PA, and MnO$_2$-BA.

**MnO$_2$-C**

![Graph of MnO$_2$-C XRD pattern]

**MnO$_2$-AA**

![Graph of MnO$_2$-AA XRD pattern]

**MnO$_2$-PA**

![Graph of MnO$_2$-PA XRD pattern]
MnO$_2$-BA