Electronic Supplementary Material (ESI) for ChemComm.

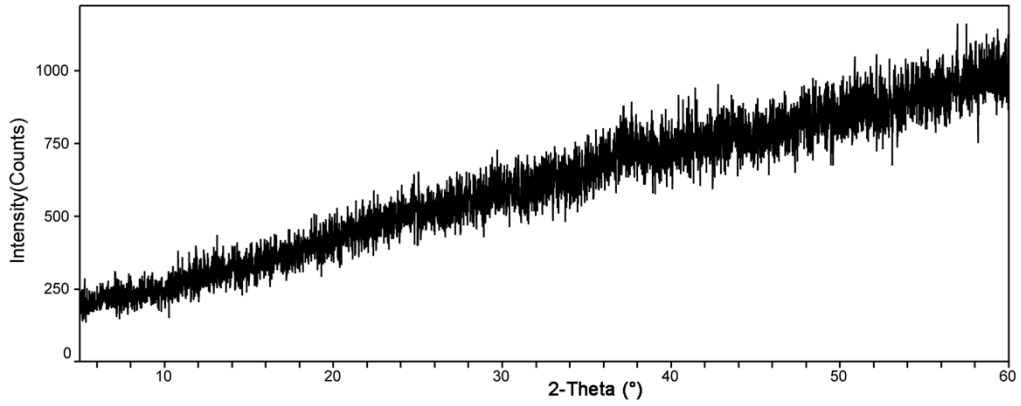
Supplemental Material

S1. *Synthesis of Manganese Oxide Porous Spheres*

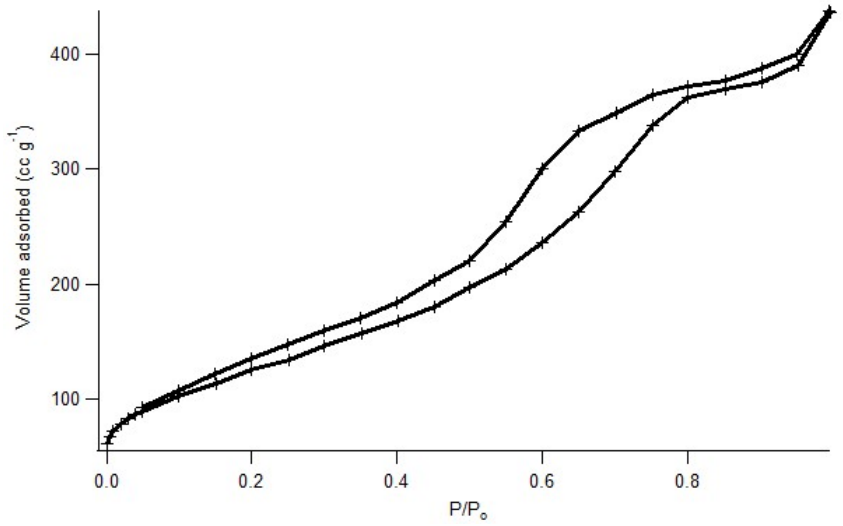
Reagent grade chemicals were obtained from Fisher Scientific Company and used as received.

In a typical synthesis, a 20 mM solution of KMnO4 was prepared by dissolving 0.158 g (1 mmol) of KMnO4 in 25 mL of distilled water. A second solution was prepared with 1.1 mL n-butanol and 2.3 mL butyric acid dissolved in 25 mL of distilled water. The permanganate solution was added to the n-butanol/butyric acid solution and the resulting reaction mixture was stirred vigorously for 20 minutes. The resulting brown precipitate was isolated by vacuum filtration through a medium porosity glass frit, washed three times with distilled water and dried at 110 °C.

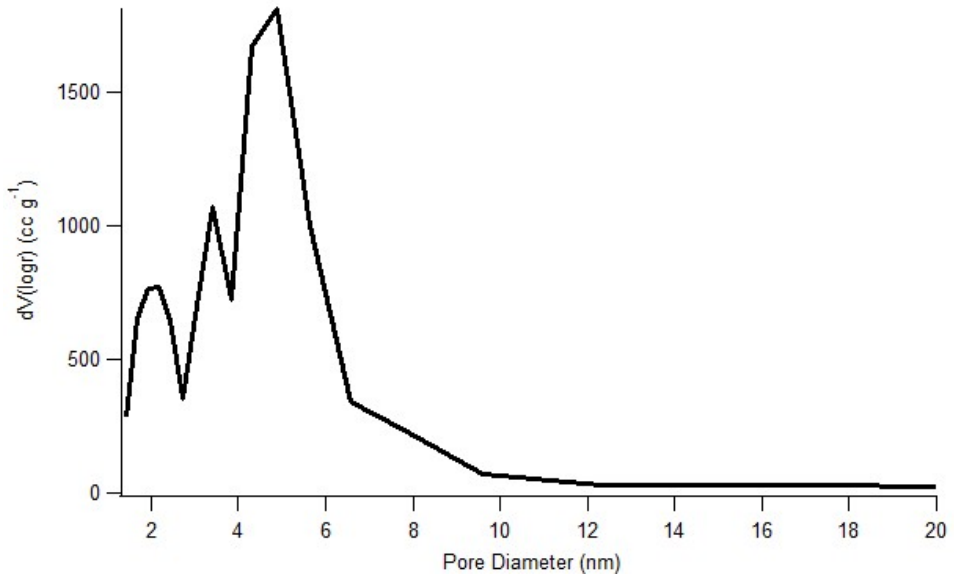
S2. Powder XRD pattern of porous manganese oxide spheres (amorphous)



S3. Nitrogen adsorption/desorption isotherm for porous manganese oxide spheres



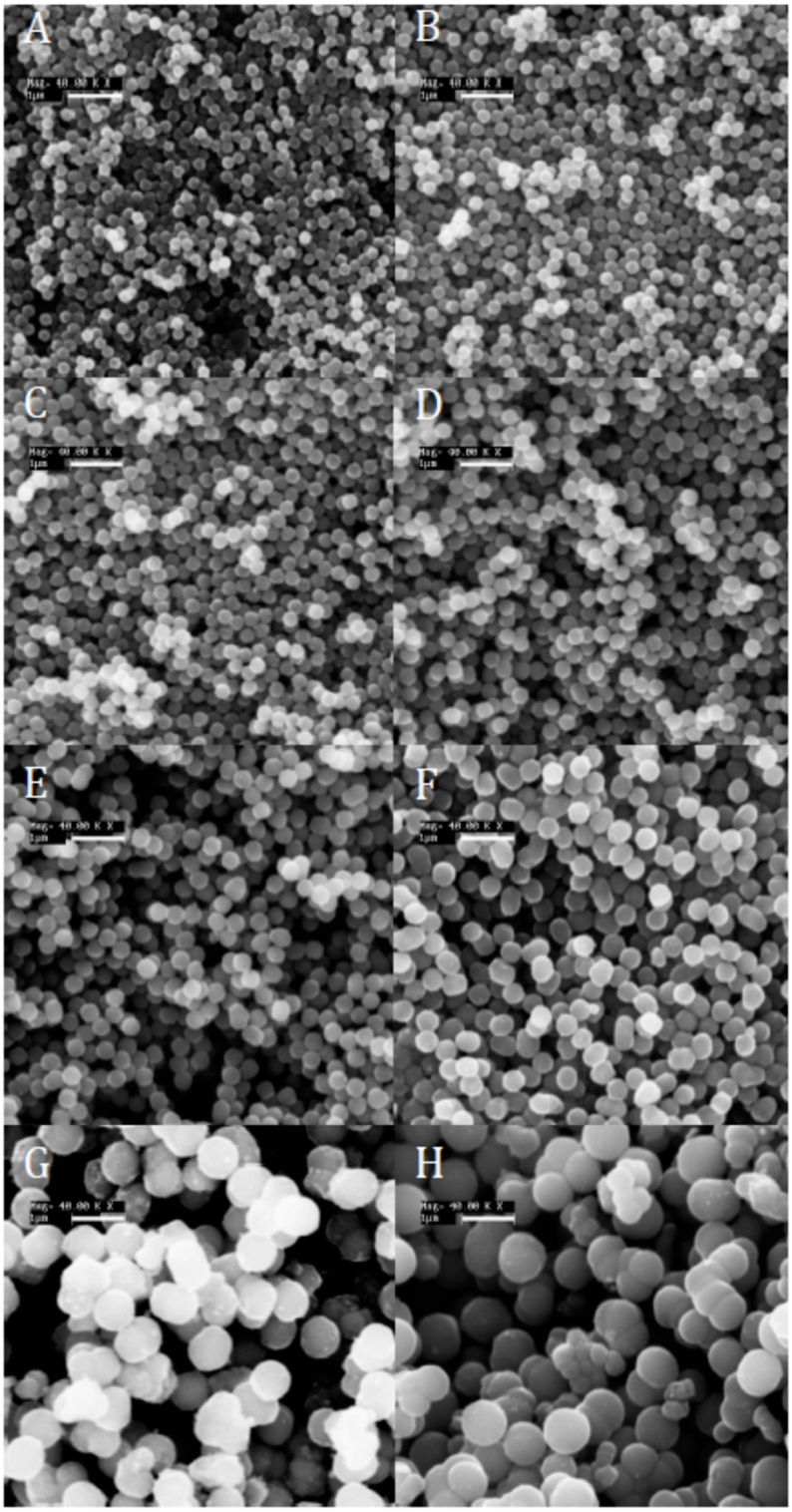
S4. BJH pore size distribution for porous manganese oxide spheres, showing three distince pore size distributions in the meso-range. The major distribution is at 4.88 nm, followed by 3.83 nm and 2.18 nm.



S5. Listing of surface areas for manganese oxide porous spheres with different diameters.

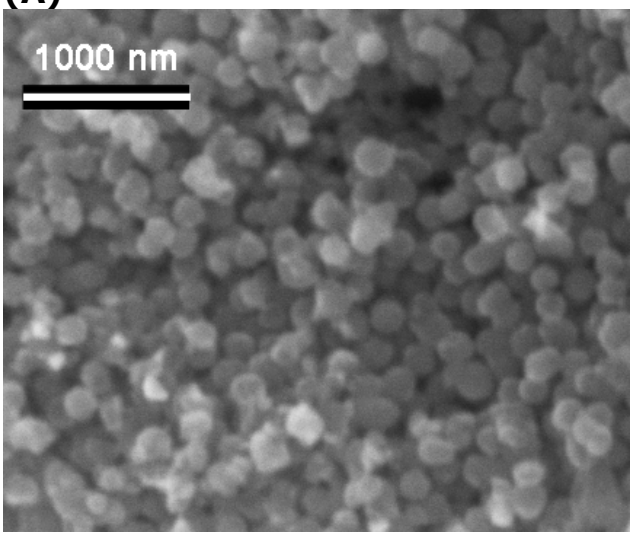
[KMnO4] (mM)	Sphere Diameter (nm)	BET Surface Area (m^2/g)
8	267	253
12	303	256
16	336	217
20	379	243
24	410	176
30	497	217
40	633	204

S6. SEM images of different sized manganese oxide porous spheres prepared using the procedure in S1, but with different concentrations of $KMnO_4$. In all images, the magnification is 40,000x and the scale bar represents 1 micron. [$KMnO_4$]: (A) 8 mM, (B) 12 mM, (C) 16 mM, (D) 20 mM, (E) 24 mM, (F) 30 mM, (G) 40 mM, (H) 60 mM.



S7. SEM images of manganese oxide formed at different dwell times.
(A) 4 minutes. (B) 8 minutes. Total reaction time in S1 is 20 minutes.

(A)



(B)