Supplementary Material (ESI) for Chemical Communications

Synthesis of a Manganese Oxide Nanocomposite through Heteroepitaxy in Aqueous Medium.

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ELECTRONIC SUPPLEMENTARY INFORMATIONS

Techniques.

MnO_4^- The supernatant absorbance was measured at a wavelength of 525 nm and the MnO_4^- concentration was determined using a calibration curve (ε(525 nm)=2323 mol^{-1} L cm^{-1}).

Elemental Analysis. K, Mn elemental ratios were determined at the CNRS Service Central d'Analyse, USR 59 by inductively coupled plasma atomic emission spectroscopy (ICP-AES).

X-Ray Diffraction (XRD). Powder XRD measurements were performed with a Brucker D8 X-ray diffractometer operating in the reflection mode at Cu Kα radiation with 40 kV beam voltage and 40 mA beam current. The data were collected in the 10-70° range (2θ) with steps of 0.05° and a counting time of 14 s.

Field Emission Scanning Electron Microscopy (FESEM). The homogeneity of the samples and the morphology of the particles were studied by FESEM using a Gemini Zeiss apparatus (3 kV).

Transmission Electron Microscopy (TEM). The nanoparticle morphology and orientation were studied by TEM and High Resolution TEM (HRTEM) using JEOL 100 CX (100 kV) and Philips CM20 (200 kV) apparatus respectively. Samples were prepared by evaporating a drop of aqueous diluted suspension on a carbon-coated copper grid. The *d*-spacings obtained from Selected Area Electron Diffraction (SAED) pattern were calibrated using Au pattern. For ultra thin section TEM observations, samples were embedded in an epoxy resin. Then cutting of the block was performed using an ultra microtome (Ultracut Reichert Jung). Thickness of the sections is *ca.* 70 nm.

N_2 adsorption-desorption. The specific surface area of the initial cryptomelane sample was determined using an ASAP 2010 Micrometrics apparatus following the BET analysis. Adsorption of N_2 was performed at 77 K. Samples had been previously out-gassed by heating at 120 °C over night under a 3 μm Hg pressure.

Figures.

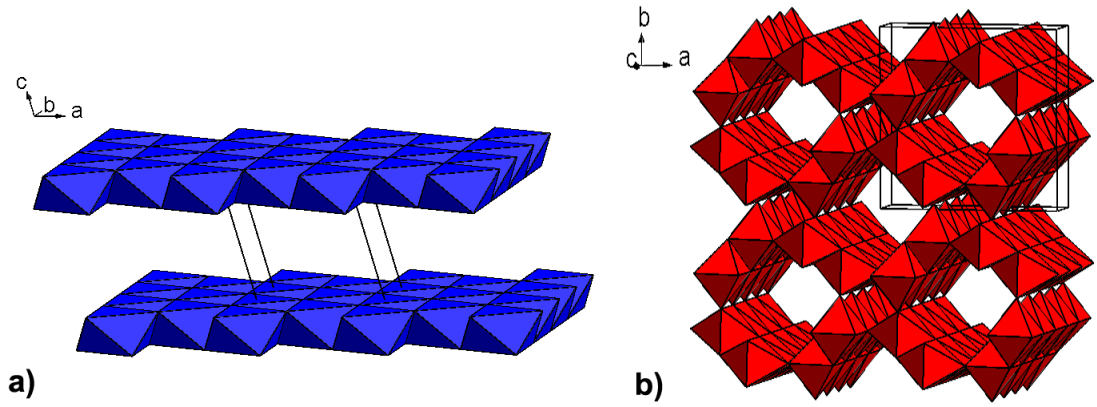

Figure SI-1. Idealized frameworks of K^+ intercalated (a) birnessite (δ-MnO_2) and (b) cryptomelane (α-MnO_2). The birnessite interlayer contains potassium ions and water molecules, which are not sketched. The cryptomelane tunnels also contain some K^+ ions and H_2O molecules.

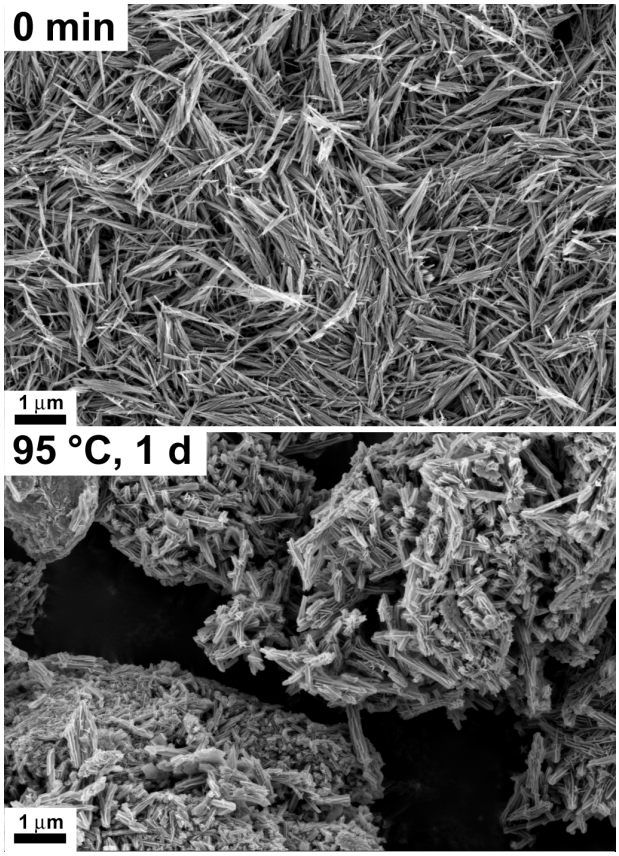

Figure SI-2. Low magnification FESEM micrographs of the initial cryptomelane particles and the final nanocomposite.