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Supporting Information

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One-Pot Synthesis of Manganese Oxide Nanosheets in an Aqueous Solution: Chelation-Mediated Parallel Control of Reaction and Morphology Toward a Novel Green Route

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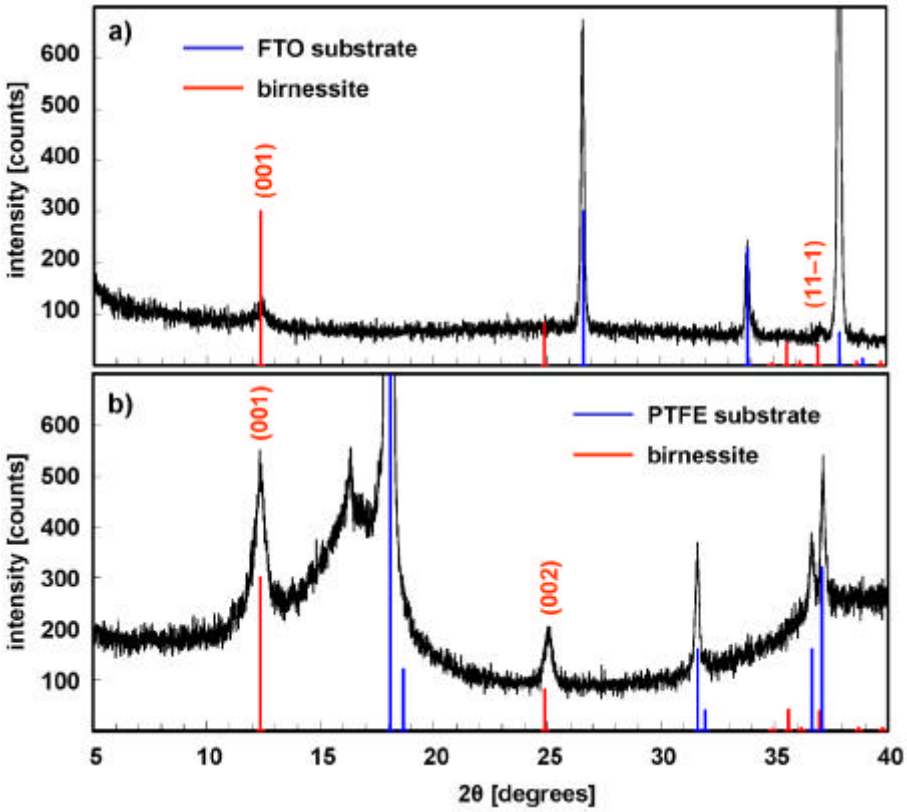

Figure S1. XRD patterns of the birnessite nanosheet films on FTO (a) and PTFE (b) substrates. The peak intensity of (001) and (002) planes differs between the nanosheets deposited on FTO substrate to that on PTFE. These peaks were enhanced on the sheets grown on PTFE substrate and were weakened in the case of FTO substrate. In addition, the peak of (11–1) plane was recognized on the FTO substrate. According to these XRD patterns and electron microscope

analysis in Figures 2 and 3, we deduced a specific orientation of the nanosheets on the substrates.

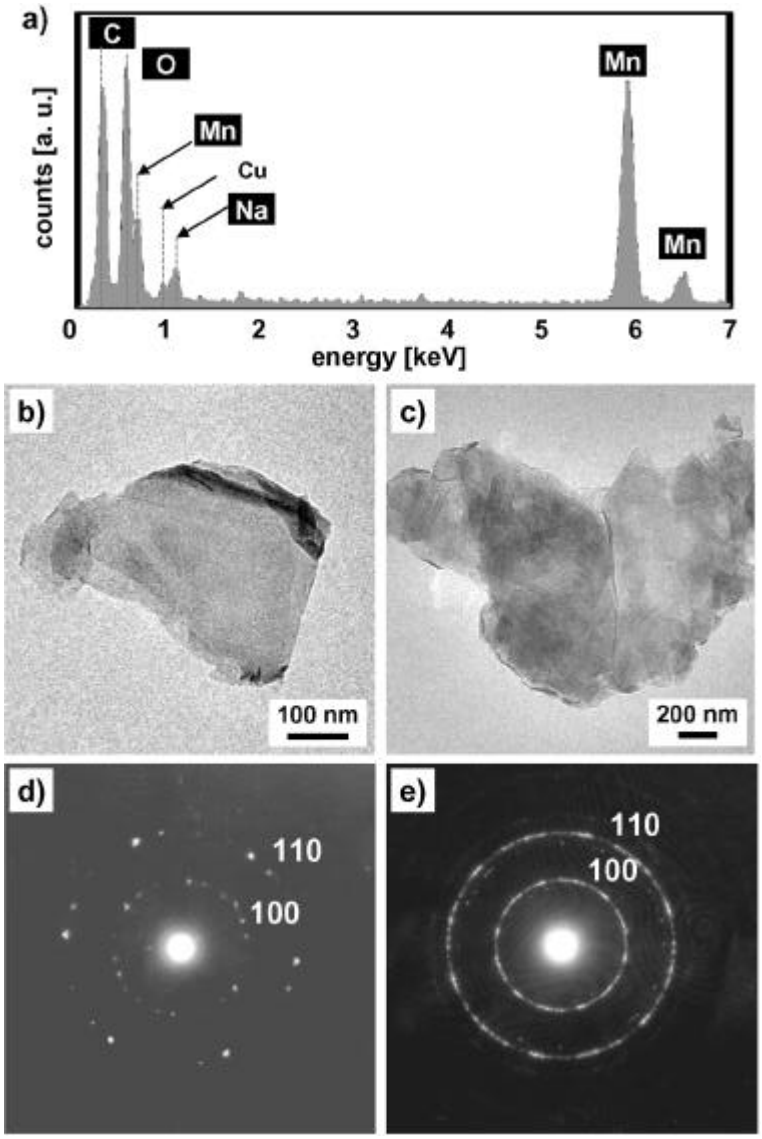

Figure S2. Supplemental FETEM analysis of the nanosheets. a) EDX spectrum indicating the presence of carbon, oxygen, sodium, and manganese collected from the nanosheets; b,c) bright-field images of stacked, and aggregated nanosheets, respectively; d,e) the SAED patterns acquired around the images in the panels b) and c), respectively.

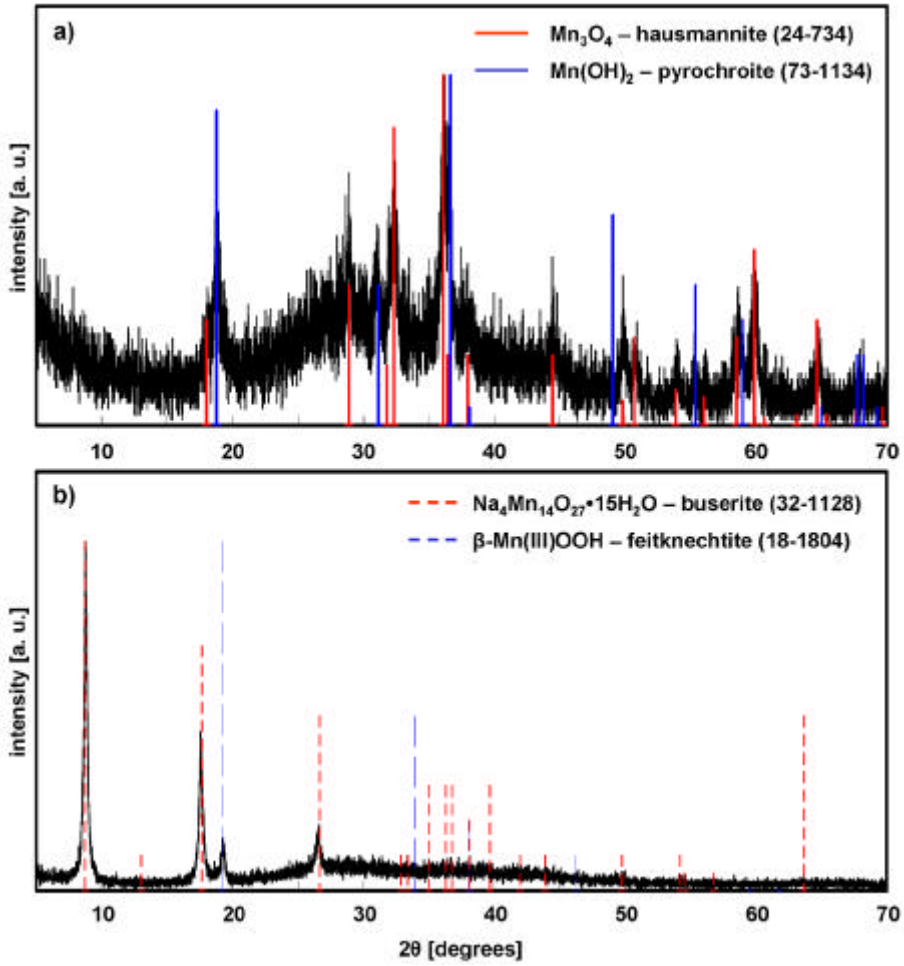

Figure S3. XRD patterns collected from the wet slurry of the resultant manganese oxide. a) the precipitates synthesized in the absence of EDTA. The divalent manganese ions were mainly contained in pyrochoite $Mn(OH)_2$ and hausmannite Mn_3O_4. After drying this sample, black powder of hausmannite Mn_3O_4 was only observed with air oxidation. b) the precipitates synthesized in the presence of EDTA. The peaks are assigned to busserite and feiktnechtite containing trivalent and tetravalent manganese species, whereas the divalent manganese species are not found in the pattern. It was reported that the dehydration of the interlayer water molecules resulted in the phase transition from busserite to birnessite. These results indicate that the precipitates contained trivalent and tetravalent manganese species.