Supporting Information for

Applications of ALD MnO to Electrochemical and Photoelectrochemical Water Splitting

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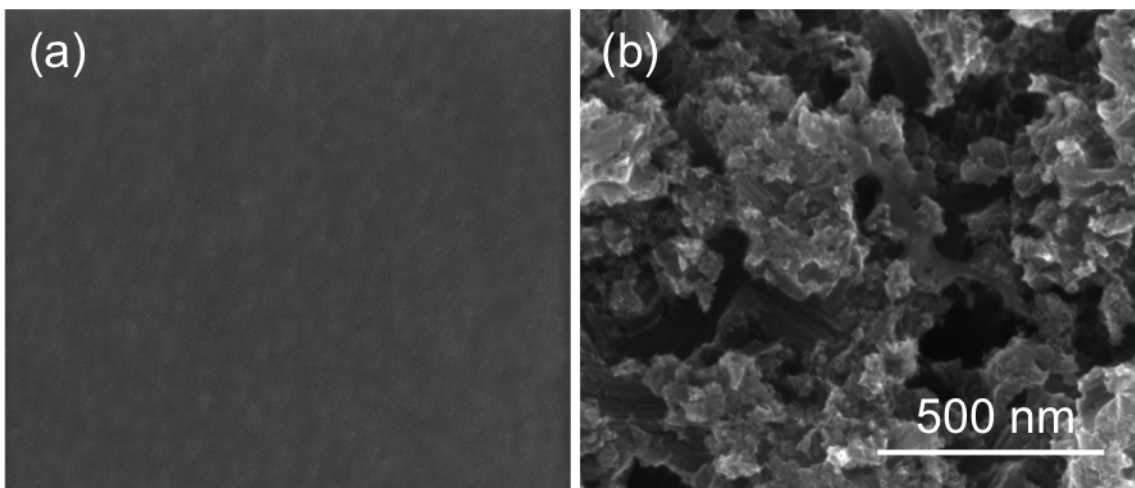[§]These authors contributed equally to this work.

Figure S1: SEM micrograph of (a) smooth glassy carbon (s-GC) and (b) high surface area glassy carbon (HSA-GC) substrates.
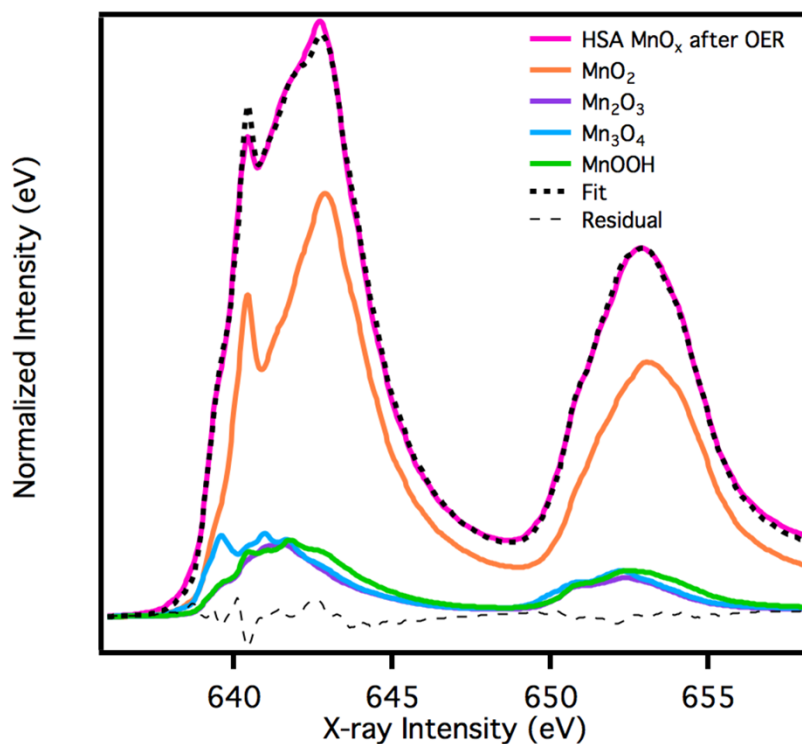

Figure S2: Plotted is a sample fitting of the Mn L-edge region XAS spectra. The sample shown is the fit of the HSA MnO_x sample after OER. The contributions of MnO_2, Mn_2O_3, Mn_3O_4, and MnOOH to the fit are also plotted.

Table S1: Comparison between other MnO_x OER Catalysts

System	Electrolyte	U_{RHE} (j = 10 mA/cm^2) (V)	Reference
Ag Nanoparticles + α-MnO_2	0.1 M KOH	~1.93	[1]
MnO_x	0.1 M KPi at pH 7	> 1.9	[2]
MnO_x	1 M KOH	> 1.9	[3]
Oxidized MnO	0.1 M KPi	> 1.86	[4]
Nanostructured Mn(III) oxide	0.1 M KOH	1.77	[5]
Electrodeposited MnO_x	Phosphoric acid, KNO_3, KOH. (pH 13)	~1.75 (extrapolated from Tafel slope)	[6]
ALD MnO on HSA-GC	0.1 M KOH	1.70	(this work)
Electrodeposited MnO_x on HSA-GC (~1 micron thick)	0.1 M KOH	~1.6	[7]
Massive α-Mn_2O3_3 (tablet ~2 mm thick)	1 M KOH	1.58	[8]

Table S2: Comparison of MnO_x Surface Areas

	$j_{1.26\ V}$	$j_{1.3\ V}$	$j_{0.2\ V}$	Redox Feature 0.96 V
HSA-GC MnOx/s-GC MnOx	2.5	2.1	1.8	3.1
Annealed MnOx/s-GC MnOx	1.3	1.3	1.5	1.1

The determination of the surface area is difficult for transition metal oxide systems. Here, we compare the surface area ratios of the HSA MnO_x sample to the flat GC MnO_x sample and the annealed MnO_x sample to the flat GC MnO_x sample. The first three columns are calculated from an estimate of the surface area from the capacitive currents at 1.26 V_{RHE}, 1.3 V_{RHE}, and 0.2 V_{RHE}, respectively. The final column estimates the surface area ratio from the charge passed in the redox feature in at 0.96 V_{RHE}. All measurements are for the 5th OER sweep.

Supporting Information References

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