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Supplementary Materials

Tunable Mn Oxidation State and Redox Potential of Birnessite Coexisting with Aqueous Mn(II) in Mildly Acidic Environments

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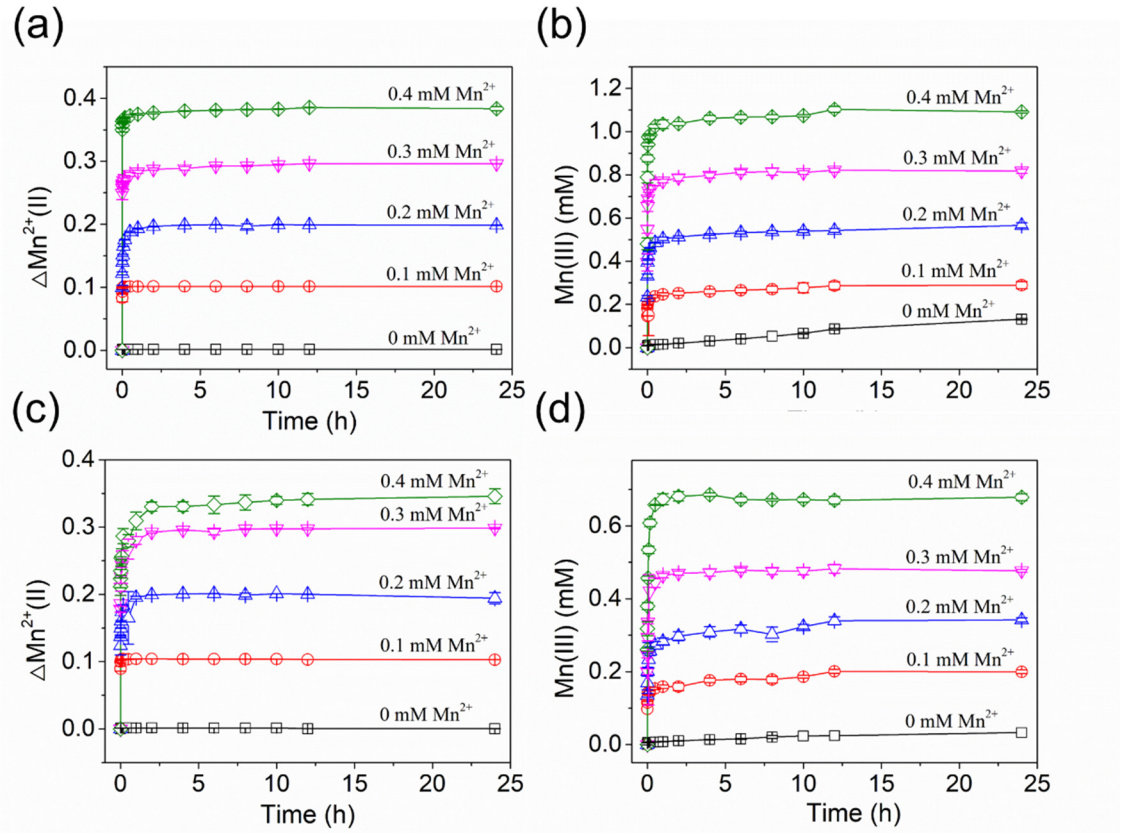

Figure S1. Time-dependent concentrations of aqueous Mn^{2+} uptake and sodium pyrophosphate-complexed Mn(III) in the reactions of 200 mg/L birnessite and 0–0.4 mM Mn^{2+} at pH 4.5 (**a**,**b**) and at pH 6.5 (**c**,**d**). Error bars indicate standard deviation from three independent experiments.

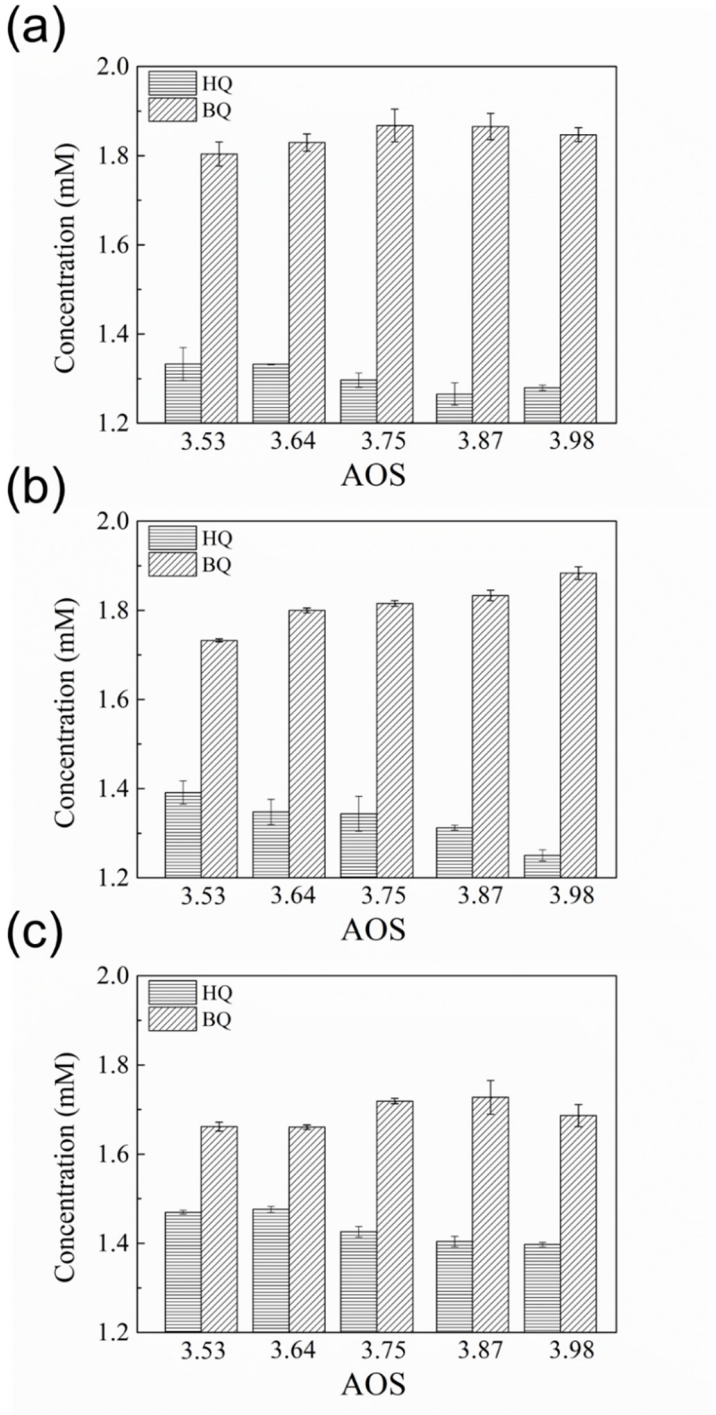

Figure S2. The concentrations of hydroquinone (HQ) and benzoquinone (BQ) after 24-h oxidation of HQ (the initial HQ concentration = 2.73 mM) by 300 mg/L birnessite samples with different AOS values at pH 4.5 (**a**), pH 5.5 (**b**), and pH 6.5 (**c**), respectively. Error bars indicate standard deviation from three independent experiments.

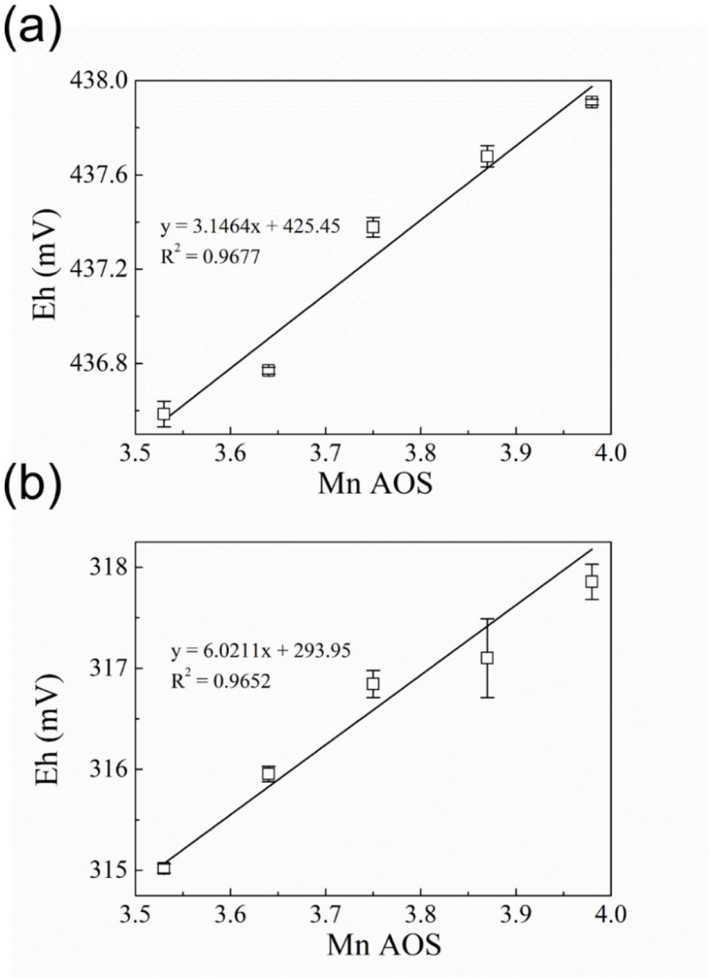

Figure S3. The calculated E_h values of birnessite with different AOS values, based on the equilibrium concentrations of HQ, at pH 4.5 (**a**) and pH 6.5 (**b**), respectively. All data show a linear relationship between E_h and Mn AOS of birnessite. Error bars indicate standard deviation from three independent experiments.

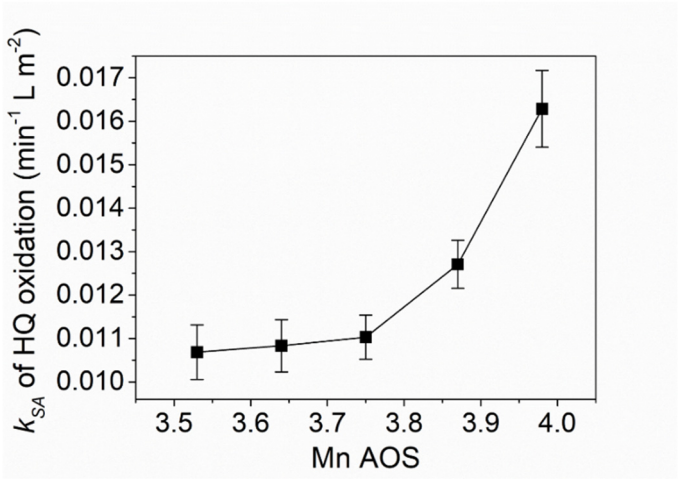

Figure S4. Surface area-normalized pseudo-first-order initial rate constants (k_{SA}) for HQ oxidation by birnessite versus the calculated Mn AOS. Error bars indicate standard deviation from three independent experiments.

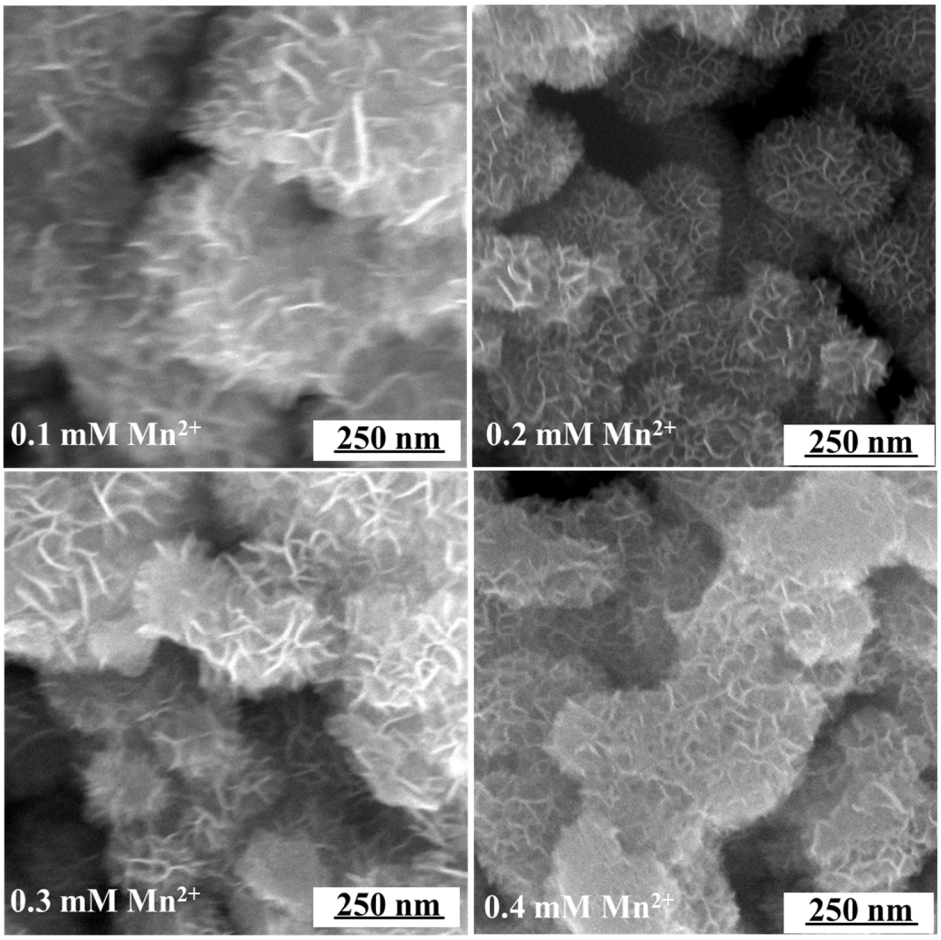

Figure S5. The representative SEM images of birnessite particles (200 mg/L) after reaction with 0.1 mM (**a**), 0.2 mM (**b**), 0.3 mM (**c**), and 0.4 mM (**d**) Mn^{2+} at pH 5.5.