Oxidation of MnO(100) and $NaMnO_2$ formation: Characterization of Mn^{2+} and Mn^{3+} Surfaces via XPS and Water TPD

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Highlights

Mn_3O_4-like and Mn_2O_3-like surfaces can be formed in UHV by the oxidation with O_2 of the clean and nearly-stoichiometric MnO(100).

• A $NaMnO_2$-like surface can be produced by oxidation of the MnO(100) pre-covered with multilayers of metallic Na.

• Water is sensitive to the Mn oxidation state, and desorbs at different temperatures from the manganese oxide surfaces dependent on the Mn oxidation state.

• On the $NaMnO_2$-like surface, pre-adsorbed water blocks the uptake of CO_2, and water displaces pre-adsorbed CO_2.