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Oxidation of MnO(100) and NaMnO<sub>2</sub> formation: Characterization of Mn<sup>2+</sup> and Mn<sup>3+</sup> Surfaces via XPS and Water TPD

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### Highlights

Mn<sub>3</sub>O<sub>4</sub>-like and Mn<sub>2</sub>O<sub>3</sub>-like surfaces can be formed in UHV by the oxidation with O<sub>2</sub> of the clean and nearly-stoichiometric MnO(100).

- A NaMnO<sub>2</sub>-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<sub>2</sub>-like surface, pre-adsorbed water blocks the uptake of CO<sub>2</sub>, and water displaces pre-adsorbed CO<sub>2</sub>.

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