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Water uptake on thin film MgO using ambient pressure XPS
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Understanding the molecular level interactions of water with metal oxide surfaces is important in both industrial processing and environmental chemistry. MgO(100) is one of the most widely studied metal oxide surfaces due to its simple rock salt cubic structure. However, whether water adsorbs dissociatively (hydroxylation) or molecularly (thin film wetting) remains unanswered. We have characterized the uptake of water on 7ML MgO(100) on Ag(100) at RT using ambient pressure XPS. Surface compositions were measured in-situ under water vapor pressures ranging up to 1 Torr. Our results indicate that initial hydroxylation occurs at low pressures mostly at Mg(2+) sites up to about 0.1 mTorr. At higher coverages both hydroxylation and thin film wetting continues up through 1 Torr. We will also discuss results from: 1. water uptake under higher/lower effective vapor pressures, 2. additional MgO(100) film thickness, and 3. water uptake on MgO(111)/Ag(111) surfaces.

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