

Water on Metal Oxides: To Dissociate or Not?

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The molecular level understanding of metal oxide surfaces has important implications in chemical processing and trace gas adsorption in catalysis and atmospheric aerosol chemistry. The adsorption and/or dissociation of water at the interface can enhance or inhibit interfacial transformations. It is therefore important we understand the extent to which water reacts with metal oxide surfaces. We will present recent efforts to understand the interfacial chemistry of metal oxide single crystal and thin film surfaces exposed to water vapor using in-vacuo X-ray Photoelectron Spectroscopy (XPS), ambient pressure XPS, scanning tunneling microscopy (STM), kinetic modelling and computer simulations. Results highlight the importance of surface chemistry, metal oxide crystal termination, and external humidity conditions on the interfacial dynamics and chemistry of water at metal oxide interfaces.