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Acidic Water Monolayer on Ru(0001)

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Water molecules on a Ru(0001) surface are anomalously acidic compared to bulk water. The observation was made by conducting reactive ion scattering, reflection absorption infrared spectroscopy, and temperature-programmed desorption measurements for the adsorption of ammonia onto a water layer formed on Ru(0001). The study shows that the water molecules in the first intact H₂O bilayer spontaneously release a proton to NH₃ adsorbates to produce NH₄⁺. However, such proton transfer does not occur for H₂O, OH, and H in a mixed adsorption layer or for H₂O in a thick ice film surface.

Keywords: Water-solid interface, Adsorption, Surface analysis, Acidity, Proton transfer

