Hydration layer mapping on mineral surfaces

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Solid-liquid interfaces are omnipresent both in nature and technology. In geochemistry, many processes are governed by the structure and reactivity of the involved interfaces [1]. Likewise, understanding biomineralization for biomimetic materials design will require elucidating the fundamental steps in nucleation and growth at the interface [2]. Recent advances in dynamic atomic force microscopy (AFM) have opened up the possibility to resolve the solvation structure at solid-liquid interfaces [3]. In this talk, we will present improvements in AFM instrumentation that allow for three-dimensional solvation layer mapping [4]. Using this technique, interfacial cations can be identified [5] and defect sites can be resolved by their hydration structure [6]. These insights will be important for gaining a molecular-level understanding of the structure and reactivity of solid-liquid interfaces.

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