

Im Rahmen des Physikkolloquiums spricht

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über

Solvation layer mapping using the atomic force microscope

Abstract:

Solid-liquid interfaces are omnipresent both in nature and technology. In particular, mineral-water interfaces are at the heart of many fundamental processes in the environment, e.g., dissolution, growth and weathering of rocks as well as water condensation and ice nucleation in clouds. Understanding these processes is pivotal for a multitude of fields, including in-situ carbon mineralization for future carbon capture and storage technologies as well as for the development of reliable climate models.

Gaining molecular-level understanding of elementary processes will require detailed spatial information of the solvation structure at the interface. In this talk, the capability of atomic force microscopy to directly map the solvation structure will be presented [1]. The performance will be demonstrated by discriminating calcium and magnesium at the dolomite interface by the difference in their hydration structure [2]. The specific case of feldspar will be presented, as this class of minerals is known to provide dustparticles being especially active in ice nucleation in clouds [3].

[1] H. Söngen et al., Rev. Sci. Instrum. 87 (2016) 63704.

[2] H. Söngen et al., Langmuir 33 (2017) 125.

[3] T. Dickbreder et al., Nanoscale 16 (2024) 3462.