

Hydration and Distribution of Ions at the Mica-Water Interface

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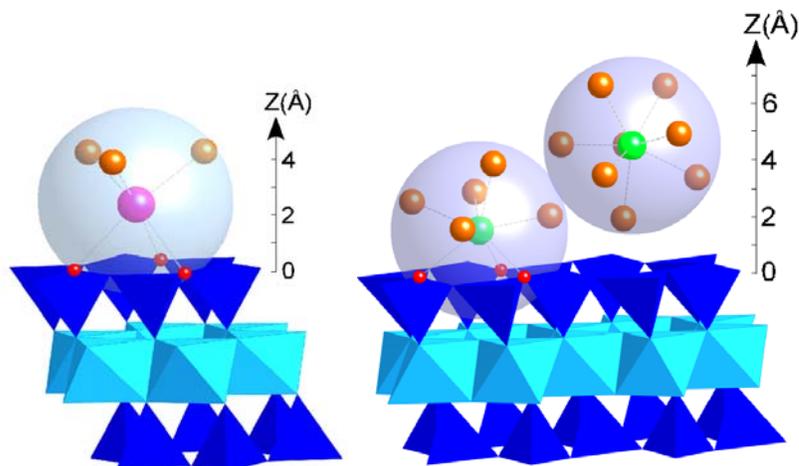


Figure: Schematic model depicting the vertical distribution of Rb⁺ (left) and Sr²⁺ (right) at the muscovite-water interface along with the adsorbed ion's hydration shell.

- The distribution of cations at muscovite surfaces in contact with aqueous electrolyte solutions was determined revealing new insights into the interaction of cations with aqueous-mineral interfaces.
 - The results demonstrate that cation interactions with mineral surfaces are substantially more complex than previously believed with, in the case of divalent cations, a coexistence between two adsorption species (“inner-sphere” and “outer-sphere”).
 - It is widely assumed that outer- and inner-sphere species are inherently weakly and strongly bound, respectively, to a mineral surface. Our results show that this assumption is incomplete.
- These results reveal that the actual interfacial ion distribution is determined by a delicate balance between the electrostatic attraction between the ion and the charged substrate and the energy cost associated with dehydration of the adsorbing cation and the substrate surface.

References:

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