

The primary steps of ion solvation

Content

I will present recent experimental results that have enabled us to observe the solvation dynamics of a single alkali cation ion in liquid helium with atomic resolution and on the natural femtosecond time scale.

A single Na^+ or Li^+ ion is created instantly at the surface of a liquid He nanodroplet and we measured in real time the gradual attachment of individual He atoms to the ion. Our results show that both ions bind 8-9 He atoms during the first 6 ps. However, while the time-dependent number distribution of solvent atoms for Na^+ are well-described by Poisson distributions, Li^+ shows irregular distributions revealing the formation of particularly stable solvation-complexes. The experimental findings for Na^+ are in agreement with numerical simulations based on time-dependent density-functional theory.

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