



Metals in Nanodroplets: FT-MS and IR Spectral Signatures of Solvated Metal Clusters

Supervision:

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Two PhD positions are currently available in the Department of Earth Sciences, University of Hong Kong. The aim of these projects is to study the speciation of metal clusters in water vapor, and in particular, to probe the structure of the water solvation shell around metal clusters using FT-mass spectrometry and IR spectroscopy. As part of this project the PhD student will measure IRMPD spectra of metal clusters under FT-MS conditions using table top OPO and free-electron laser systems. The combination of both methods will facilitate measurement of IR spectra of mass-selected ions, which, in combination with quantum chemical tools will help to unravel the structure of the ion core and water solvation shell; currently initiated FT-MS IR studies center on microsolvated polynuclear metal clusters containing Au, Cu, Ag, and make use of a custom-built OPO laser system and FEL systems with tunable output in the mid-IR range.

For additional information please contact Dr. Kono Lemke at kono@hku.hk or visit <http://www.earthsciences.hku.hk/people/academic-staff/dr-lemke-kono> for more details; Closing date for applications is 30.04.2019.

References & Further Reading:

- K.H. Lemke** and T.M Seward (2018) Molecular clusters and solvation in volcanic and hydrothermal vapors. *Reviews in Mineralogy and Geochemistry*, **84**, 57.
- K.H. Lemke** (2017) Structure and binding energy of the H₂S dimer at the CCSD(T) complete basis set limit. *Journal of Chemical Physics*, **146**, 234301.
- K.H. Lemke** (2014). Gold Chloride Clusters with Au (III) and Au (I) probed by FT-ICR mass spectrometry and MP2 theory. *Physical Chemistry Chemical Physics*. **16**, 7813.