

Joint CQSE and CASTS Seminar

Weekly Seminar
Dec. 16, 2016 (Friday)

TIME Dec. 16, 2016, 14:30 ~ 15:30
TITLE Probing valence electronic structures and interfacial solvation properties of biological and organic aqueous nanoaerosols via aerosol VUV photoelectron spectroscopy
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Abstract

Aqueous aerosols are complex systems that exist ubiquitously in nature. The crucial roles of aqueous aerosols have been recognized in a variety of important fields, encompassing the aerosol science, atmospheric chemistry, marine chemistry and environmental science. To better understand the physicochemical activities of these complex systems, it is particularly important to assess their valence electronic properties under either physiologically or atmospherically relevant aqueous environments. Recently, we applied the recently built aerosol VUV photoelectron spectroscopy to investigate the valence electronic structures and interfacial solvation characteristics of several complex systems that are of particular biological or environmental significance, including cysteine (Cys), a highly bioactive amino acid (Ref.1), glutathione (GSH), a thiol-containing tripeptide (Ref. 2) and some small amphiphilic organic species such as phenol and dihydroxybenzenes in the form of aqueous nanoaerosols, using the undulator-based VUV radiation as the ionization source (U9, BL21B2, NSRRC, Hsinchu, Taiwan). The pH-dependent valence electronic properties of chosen aqueous nanoaerosols have been interrogated, revealing their electronic evolution and interfacial solvation behaviors. The newly developed aerosol VUV photoelectron spectroscopy apparatus sheds new light for one to assess the valence electronic structures of nanoscaled aerosols, complex molecular assemblies and other novel nanomaterials in a size-selective and composition-controlled way. With this new aerosol technique, it is promising to address numerous fundamental but critical issues regarding aerosols in various related fields, including the environmental science, the atmospheric chemistry and the biomedical science.

Acknowledgements: This work is supported by the Ministry of Science and Technology of Taiwan, R.O.C. under the project numbers of NSC 102-2113-M-110-005-MY2, MOST 104-2113-M-110-011 and MOST 105-2119-M-110-002.

References

- [1] C.-C. Su, Y. Yu, P.-C. Chang, Y.-W. Chen, I. Y. Chen, Y.-Y. Lee, C. C. Wang, *J. Phys. Chem. Lett.* **6**, 817-823 (2015).
- [2] P.-C. Chang, Y. Yu, W.-R. Chen, C.-C. Su, M.-S. Chen, Y.-L. Li, T.-P. Huang, Y.-y. Lee, C. C. Wang, *J. Phys. Chem. B* **120**, 10181-10191 (2016).

