ABSORPTION SPECTRA OF SMALL MOLECULES IN CONDENSED PHASES IN THE VACUUM ULTRAVIOLET REGION

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Even though electronic spectra of small molecules in the gaseous phase are less intensively investigated in the vacuum ultraviolet region, < 200 nm, than in the visible and near ultraviolet regions, still less is known about spectra of these species in the solid phase or dispersed in solid noble-gas diluents. Because energies of photons in this region are sufficient to effect photo-dissociation or photo-ionization, the photochemical implications constitute an essential component of the analysis of these spectra for static samples. Information about spectra of pure compounds and their mixtures is vital in the modeling of spectra of cold planetary surfaces. Using radiation from a synchrotron and a cryogenic refrigerator capable of attaining a temperature/K in a range [4-12], we have recorded the spectra of several small molecular species[a,b,c] and subjected them to quantitative analyses through deconvoluting overlapping diffuse electronic and vibrational substructure and carefully fitting components to a reduced profile. We discuss and compare spectra of the same molecular species in gaseous and solid phases, and in some cases also for molecular absorbers dispersed in solid argon and krypton.

[a] H.-C. Lu, H.-K. Chen, B.-M. Cheng, Y.-P. Kuo and J. F. Ogilvie, Journal of Physics atomic, molecular optical physics, B38, 3693-3704 (2005).
[b] Y.-P. Kuo, H.-C. Lu, Y.-J. Wu, B.-M. Cheng and J. F. Ogilvie, Chemical Physics Letters, 447, 168 174 (2007)
[c] H.-C. Lu, H.-K. Chen, B.-M. Cheng and J. F. Ogilvie, to be published