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Mass analyzed threshold ionization (MATI) with VUV radiation
OLEG KOSTKO, Lawrence Berkeley National Lab, SANG KYU KIM, KAIST, Korea, KEVIN R. WILSON, Lawrence Berkeley National Lab, STEPHEN R. LEONE, UC Berkeley, MUSAHID AHMED, Lawrence Berkeley National Lab — Mass analyzed threshold ionization is a combination of threshold ionization spectroscopy with mass spectrometry. Similar to zero electron kinetic energy (ZEKE), MATI spectroscopy takes advantage of the field ionization of long lived high Rydberg states to obtain an ionization threshold and perform spectroscopy on the resulting cation. MATI at the synchrotron utilizing tunable VUV light opens up a novel way to perform spectroscopy on ions and improve the resolution in ionization energy determination in comparison with conventional photoionization efficiency curve measurements. This method is implemented at the Advanced Light Source and vibrationally-resolved MATI spectra for simple di- and polyatomic molecules (O_2 , N_2 , H_2O , N_2O , C_2H_2 , and C_6H_6) are measured. This preliminary work allows us to test the applicability of MATI at a synchrotron and prepare for investigation of more complex systems such as mixtures of molecules, isomers and clusters.

Oleg Kostko
Lawrence Berkeley National Lab

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