

STEPS Students Report

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Participated activities:

- Simulating the ion trajectories in the time-of-flight mass spectrometer using SIMION software package: checking the electrodes potentials to provide the best focusing, calculating the time of flight.

In cooperation with: Toshiaki Ando.

- Theoretical study and practice in Two-dimensional Spectral Shearing Interferometry, which was used to measure the spectral phase of the femtosecond laser pulses.

In cooperation with: Akizumi Yamada, Shinichi Fukahori, Toshiaki Ando.

- Taking part in the experiments on the photoionization of gaseous acetylene by intense ultrashort laser pulses: measurements and data processing. The obtained mass spectrum is given in the Appendix 1.

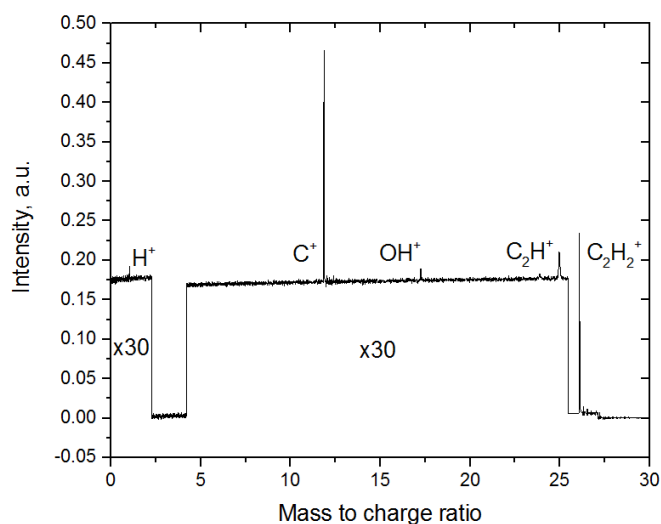
In cooperation with: Akizumi Yamada, Toshiaki Ando.

- Taking part in the pump-probe experiments on the time evolution studying of acetylene cation peak: measurements and data processing. The spectra with different accumulation time were derived. We measured the spectra with time delay between pump and probe laser pulses in a wide range from 0 to ~5000 fs with 5 fs step. One of the earliest spectrum is given in the Appendix 2, processing of another spectra is in progress now. At the moment we have found and characterized the C-C stretching vibrations of acetylene molecule and acetylene cation in the ground and some electronically excited states.

In cooperation with: Akizumi Yamada, Toshiaki Ando.

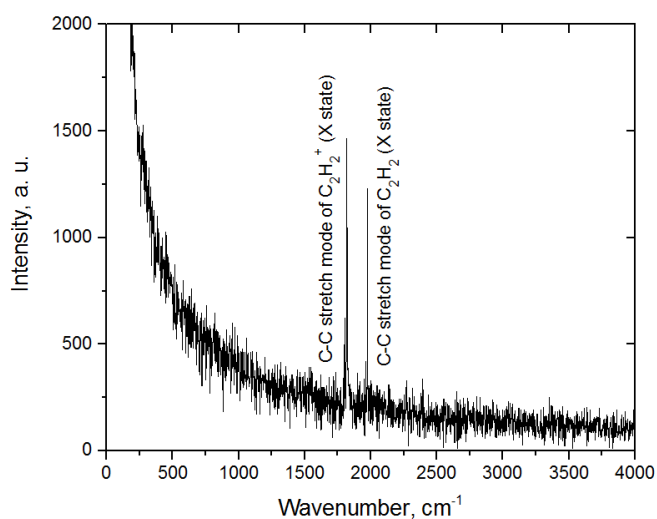
As a result, I have gained experience not only working with complicated equipment, but data analyzing, which is different from classical laser spectroscopic data. Do hope it helps me to complete my PhD project.

Appendix 1



Mass spectrum of acetylene photoionized by the intense femtosecond laser pulses. OH^+ peak is associated with the surface hydroxyl groups.

Appendix 2



Fourier transform of the pump-probe spectrum of acetylene. Peaks ($\nu=1818$ and 1974 cm^{-1}) associated with the C-C stretch modes of acetylene molecule and acetylene ion in the ground state are observed.