Report on 67th Ohio State University International Symposium on Molecular Spectroscopy by JSPS Core-to-Core Program

Takashi NAKAMURA
Chemical Resources Laboratory, Tokyo Institute of Technology,
4259 Nagatsuta - machi, Midori - ku, Yokohama 226-8503, Japan

As part of the JSPS (Japan Society for the Promotion of Science) Core-to-Core Program, I participated in 67th Ohio State University International Symposium on Molecular Spectroscopy held at the Ohio State University in Columbus, the USA on June 18 － 22, 2012 to present the results of collaboration with Professor O. Dopfer's group in TU Berlin.

Ohio State University International Symposium on Molecular Spectroscopy has a long history from 1946. The conference traditionally allows graduate students to give oral presentations. Most of international conferences never give slot of oral presentations to graduate students, thus, many graduate students in this field get the first experience of oral presentation in the Ohio meeting, as well as my case. This year, more than 400 talks are presented mainly by students. The topics of this meeting cover from fundamental molecular spectroscopy to closely related areas and applications. All the talks are classified to following groups: infrared / Raman, electronic, microwave, radical & ions, matrix / condensed phase, atmospheric species, astronomical species & processes, dynamics and theory. In addition, three special symposiums, "Photodetachment and Photoionization", "Spectroscopy of interfaces" and "Cold quantum systems" were held.

On the second day afternoon, I presented my recent research on photoionization Induced water migration of 4-Aminobenzonitrile-water 1:1 clusters by isomer - selective infrared spectroscopy. In this presentation, I reported photoionization-induced water migration of 4-aminobenzonitrile-water 1:1 clusters (4ABN - W) by isomer - selective infrared spectroscopy. 4ABN-W has two isomers at the S_0 state. One is NH isomer in which water binds to the NH group and the other is CN isomer in which water binds to the CN group. IR dip spectra of 4ABN-W were measured in D_0 after the isomer-selective ionization by resonant enhanced multiphoton ionization via S_1. It is found that almost the same IR spectra were assigned to the structure of the NH-bound isomer in the cationic state. From the result, it is concluded that water molecule bonded to the CN group migrates to the NH group induced by the photoionization.

In the question and answer session, I discussed the barrier of the isomerization and the broaden band of the hydrogen-bonded NH stretching in cationic state with several professors. I explained that the height of the barrier is low by using the IR dip spectrum based on 2-color REMPI. And I learned the relation of the errors of energy and lifetime. It was good help for me to understand my research deeply.

This meeting was good opportunity to know study and researcher around our laboratory.

During the meeting, especially the second and third day, I accompanied the Japanese group consisting of Fujii lab. in Tohoku University and Ebata lab. in Hiroshima University and attended their presentations, which were very interesting. Especially, I was interested in the two presentations: “Infrared spectroscopy of large-sized neutral and protonated methanol clusters” and “Picosecond time-resolved IR-UV pump-probe spectroscopic study on vibrational energy relaxation of benzene dimer and trimer in the CH stretching region”. I thought the large size cluster is the future direction of my study. And I realized many applications of picosecond laser spectro-scopy. I thank the group members because I could attend the meeting safely though I was alone and enjoy discussion. Aside that, I could touch varying studies about molecular clusters, mainly. In those studies, the study about the electronic and infrared spectra of lignin monomer was the most interesting. In addition, in the official gathering “Picnic” held on the third day evening, I could enjoy talk with Professor Zwier.

By the way, dozens of Japanese attend to this meeting in each year, in this time, a Japanese professor talked in the plenary meeting in the third day. He was Professor Fusakazu Matsushima, in University of Toyama, who talked terahertz spectroscopy for chemical species with evenson-type tunable FIR spectrometer. I was surprised because Japanese talked in important event like this.

Figure: Mcpherson Lab., which was the main meeting place.

After the meeting, I went to the downtown of Columbus. In the fourth day evening, I went to the art gallery of the Ohio State University. In addition, I watched the Minor-League baseball game at the ballpark, “Huntington Park” in the fifth day night. I wanted to watch a baseball game in the USA and I enjoyed! Though it was the second team match, thousands of people watched the game. I realized that the baseball was familiar in the USA again.

As mentioned above, I was able to experience not only studying recent spectroscopy through the meeting but also touching American culture. All the moments in the week were fresh and stimulating, and I thank the Core to core program for giving me such experience. Finally, I would like to express my deep appreciation to Prof. M. Fujii in Tokyo Institute of Technology and all the staffs who helped me in this program.