

Report on MERIT Long-Term Overseas Dispatch

Department of Chemistry and Biotechnology, School of Engineering
Kato Group, 3rd year Ph.D. Student, Masato Mitani

About host University and Laboratory

I visited University of Birmingham in the United Kingdom and stayed in the Dr. Etienne Baranoff research group from 9th March to 15th May 2015. University of Birmingham is located in the Birmingham city in the West Midlands, England. The university was established more than 100 years ago. There are over 19,000 undergraduate and 9,000 postgraduate students in the university. Alumni of the university include eight Nobel laureates in chemistry, physiology or medicine, and peace. It is a founding member of the Russel Group of British research universities.

Dr. Baranoff visited Kato laboratory in 2014, and he gave us a lecture. He talked about his research relating to design and synthesis, theoretical analysis of photophysical properties of novel iridium complexes, and applications for devices. His research interest also includes electron transfer, sensing, bulk morphology of organic materials, and organic photovoltaic cells. When I heard his lecture, I was interested in organic light-emitting diodes (OLEDs). In Kato laboratory, I am involved in development of functional liquid crystals by designing and synthesizing new molecules, but I am not familiar with the synthesis of organometallic compounds and their photochemical properties, fabrication of devices, and evaluation of the devices. Thus, I thought it would be fruitful to study about design and synthesis of organometallic compounds and OLEDs in Baranoff group. After his lecture, I talked with him about this long-term overseas dispatch, discussed the possible research collaborations, and then my overseas dispatch was officially accepted.



Figure 1. University of Birmingham (Aston Webb – Great Hall.)

About research project

It is said that the electricity used for lighting amounts to 20% of total electricity consumption. Thus, in terms of energy saving, it is really important to reduce the electricity consumption of lighting. Highly-efficient OLEDs can contribute to solving this problem, and this is one of the reasons why

OLEDs have been intensively studied recently. In Kato laboratory, functional liquid crystals are designed and synthesized. Functional groups accumulate through self-assembly of liquid crystals, enabling molecules to show novel functions which isolated molecules do not exhibit. In my overseas dispatch, I decided to be involved in development of liquid-crystalline organometallic compounds in order to enhance efficiency and function of metal complexes and devices.

Activities and life in host laboratory.

After I arrived at Dr. Baranoff group, I started to synthesize organometallic compounds. In completely different environment, condition, and cultures, I felt a bit of confusion and I had much more troubles than I expected. Dr. Baranoff and other members in the laboratory kindly helped me a lot. Thus, I could make progress on my research slowly, but steadily.

During my stay in University of Birmingham, we had an intermediate defense for Ph.D. students in the department. I had not had so many opportunities to see foreign Ph.D. students present their research. I enjoyed participating in the defense and I learned a lot from their manner of presentation, speaking, and asking and answering questions.

One of the most surprising things for me was that they had a lot of short-term visitors and exchange students, and the member of the laboratory often changed. During my stay, two of international students finished their visit duration and left the laboratory, but the Dr. Baranoff group would have one new overseas student after one month, and another two students after two months. I thought it would be difficult and tough to manage laboratory. I was impressed that Ph.D. students in the group helped the management and they practically taught experiments to the new international students as well as they promote their own research efficiently. I learned not only experiments and knowledge about metal complexes but also their skills for time management, creating priorities, and sense of balance in life and work.

Acknowledgements

I am grateful to the organizer of MERIT for financial support and providing me with this opportunity to visit University of Birmingham. I would like to express my appreciation for all the support from Dr. Etienne Baranoff, prof. Takashi Kato, prof. Hiroshi Nishihara, all the members in the Dr. Baranoff group, especially Yanouk Cudré and Antoine Herbaut who helped me during my stay in Birmingham.

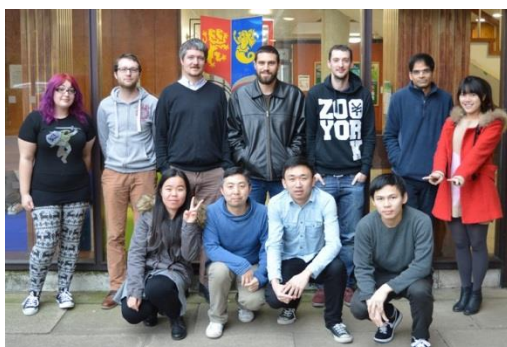


Figure 2. Group photo of Baranoff group.
(<http://etiennebaranoff.com/members/>)