

Report for MERIT Oversea Dispatch

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I studied in Dr. John C. Gordon's laboratory in Los Alamos National Laboratory (LANL) from September 3rd to November 28th.

In the University of Tokyo, my research topic is developing new palladium catalyst system for copolymerization of ethylene and polar vinyl monomer such as methyl acrylate. I use bidentate ligands containing N-heterocyclic carbene, NHC. For the palladium catalyst, Meanwhile, in Dr. Gordon's group they research on development of hydrogenation catalysts using ruthenium or iridium. In their research, multidentate ligand containing phosphine and amine. In study of catalyst using organometallic compound, using NHC instead of phosphine often improves catalytic activities or shows new reactivities. So, if I synthesize ruthenium or iridium complex bearing analog of ligands I use for palladium, they can show a new reactivity towards compounds that were not hydrogenated by reported catalyst or higher reactivities. In LANL, I could not take a picture, so I can show pictures of Los Alamos.

I also cannot write about the research in LANL because we have not reported it. I felt hard in differences between the laboratories. Glassware is quite different from each other or sometimes they do not have similar glassware. For example, they have only straight neck type Schlenk tubes, but we have curved ones in Nozaki group. Another glassware that they do not have is Kiriya funnel. It is very useful to correct solid from suspension, but I had to use glass filter for correction. However, some apparatus is very convenient for me. Heating unit in globe box is useful. In Nozaki group, we cannot heat reaction mixture. To heat it, we must take out from globe box. To save time in the US, I synthesized the ligand precursors in Japan and send it to LANL. I thought these compounds were stable in the air (at least stable for a few days). However, after checking the compounds at LANL, I found one of them seemed decomposed. The possibility is that it is stable at room temperature but temperature around the compound increased while transporting. In LANL, it took very long time to get reagents that I ordered. In the University of Tokyo, it takes only a few days to get reagents. However, it took at least a few weeks to get them in LANL. So, I must be careful not to use up reagents.

LANL has strict restriction for safety. We should read so many documents about safety even if I already knew that. We should take proper live classes about high

pressure gas and waste management. I could not do experiment at all before I finished the classes. Furthermore, the classes were held only in Monday and some classes were held at the same time. It took one month to start experiment after all.



I was nervous on household in the US. I live with my parents, so I had never done household before being to the US so much. Of course, what to do for household is different in Japan and the US. However, I did it without any large trouble. We can find recipe in the Internet.

The weather in Los Alamos is quite different from that in Tokyo. It is very humid and hot in the beginning of September in Tokyo, but it was very dry and cold in Los Alamos. Los Alamos locates in East of Rocky Mountains, so it is 2,200m high from sea level. The concentration of oxygen is much lower than that in Tokyo, so I could not run for long time.



In Los Alamos, population is small (around 12,000), so if I walked for ten minutes, beautiful scenery was appeared.

I appreciate Dr. John C. Gordon, who is my supervisor in Los Alamos National Laboratory, and Dr. Pavel Dub, who is a member of Dr. Gordon group, for their kind discussion and help for the experiment. Also, I appreciate Professor Kyoko Nozaki, who is my supervisor in UTokyo, for providing such a great opportunity for the short visit and financial support.