

Enjoying My Work in Dresden

Dept. of Chemical Engineering, Surface Control Engineering Lab.

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Country: Germany

Supervisor: Prof. Stefan Kaskel

Institute: Dresden University of Technology, Leibniz Institute of Polymer Research Dresden

1. Applying a Force on DUT-8($\text{Ni}_{1-x}\text{Co}_x$) Particles

I've conducted the study in the Stefan Kaskel's group at Technische Universität Dresden (TUD) and in the Günter K. Auernhammer group at Leibniz-Institut für Polymerforschung Dresden (IPF). Stefan's group focuses on the characterization of metal–organic frameworks (MOFs) and has generated more than one hundred types of MOFs, which are named “DUT-N (Dresden University of Technology)”. Günter's group focuses on understanding interfacial properties and has revealed the properties, sometimes using atomic force microscopy (AFM). I have joined the collaborative research with the two groups and have gained much knowledge about MOF synthesis methods and AFM operation. Figure 1a depicts the resultant DUT-8 samples in the reactant solvent (N,N-dimethylformamide; DMF). Basically, the DUT-8 crystal consists of one metal ion and two organic ligands. Several research has succeeded in mixing two kinds of metal ions and has reported that the adsorption behaviors change continuously like alloy nanoparticles. Although the methods for synthesizing the DUT-8 series had already been published, our target particle size was different. My first achievement in Dresden is to downsize the DUT-8 series to the submicron order. Fig. 1b is an SEM image of DUT-8($\text{Ni}_{0.75}\text{Co}_{0.25}$). We have finally succeeded in synthesizing particles of the target size and brilliant shape. My second achievement was to reveal the difference in the flexibility of DUT series using AFM. Unfortunately, the study has not been completed within the stay due to the short term. I am continuing the study in Kyoto. From a different point of view, the failure is another chance to continue the collaboration. As we have the MOF conference next year, I will be committed to the study for making a presentation at the conference.

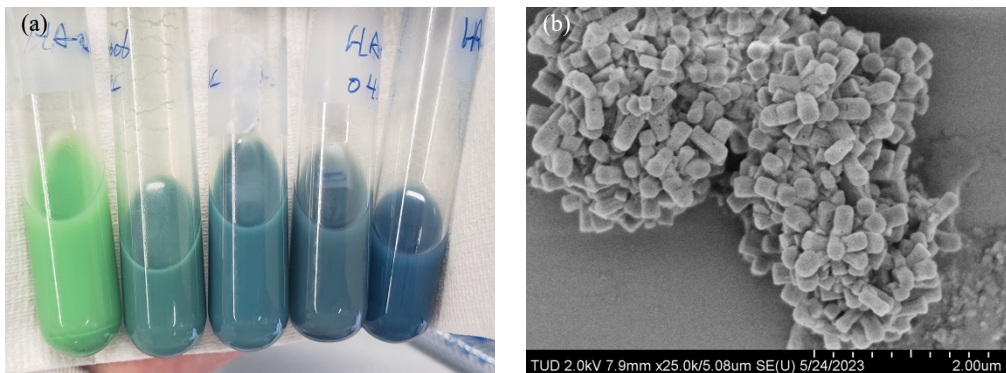


Figure 1 (a) Images of DUT-8 series in DMF. From left to right: DUT-8(Ni), DUT-8(Ni_{0.75}Co_{0.25}), DUT-8(Ni_{0.50}Co_{0.50}), DUT-8(Ni_{0.25}Co_{0.75}), DUT-8(Co), whose colours are slightly different.

(b) An SEM image of DUT-8(Ni_{0.75}Co_{0.25}).

2. Preparation for the Stay

2-1. Finding a host group

When I entered graduate school, I was introduced to Stefan by my professor at this time (Apr. 2022) and received a reply of acceptance. Afterward, we met at an international conference held in the U.S. next month (May 2022) and had a discussion about what we would try during my stay in Dresden. I had a chance to visit Dresden before the main stay in the last month of that year (Dec. 2022) and to join a laboratory tour. During this tour, I made a presentation of my ongoing research which is to understand the unique behavior of a certain MOF using AFM for Stefan. He really appreciated our research and allowed me to join the project collaborated with Günter's group at IPF. Because their study was originally similar to ours, exchanging opinions with each other made our goal clear. As we had generally made a decision before starting the main stay, I did not need a warming-up period and could do my best from the first day. In addition, as this study was strongly related to my main study in Japan, I can mainly organise the research in Dresden with taking into account the opinions of the supervisors.

2-2. Finding accommodation

Looking for accommodation was rather hard for me. Germany is a popular country as a study abroad destination, and thus available flats are sold immediately. There were very few rooms available in summer which is the best season in Europe. Actually, I finally found a flat just one week before my arrival. Before this contract, I asked a friend in Dresden for his help and was impressed because he sent this email to his colleagues for me (Fig. 2). Thanks to their help, I was able to learn about a system called "subletting" which enables us to use an empty room for a short term in the absence of an original resident. I sent messages directly to persons and obtained a contract finally. I think that a similar problem like lack of housing occurs everywhere, so I give you some advice that you have to look for accommodation a couple of months before your departure.

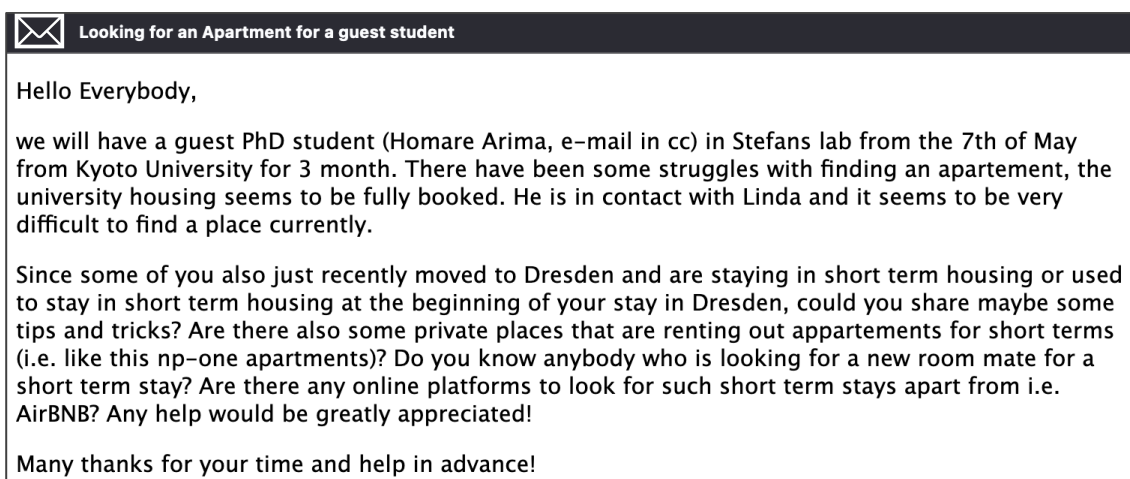


Figure 2 The email sent by a kind friend to his colleagues for asking help to look for accommodation.

This email eased my mind though I was worried about living in Dresden.

3. German Culture

To be honest, I have another reason for wanting to stay at this institute. German is one of my favourite countries in all of the foreign countries. There are brilliant culture, delicious beer, and gentle and considerate people in Germany. I would like to introduce such a beautiful culture in this chapter.

3-1. Study-Life Balance

German people don't like working. — You can easily find this information as you search Germany on Google. In my opinion, this information is partially correct. I have seen a lot of workers in Germany, such as researchers, houseworkers, waiters, secretaries, and drivers, and all of them seemed to be proud of their jobs and eager to work. In my case, I have never seen any supermarket employees smiling for guests and actively helping customers abroad except in Germany. This working style is similar to the Japanese one, which is comfortable for me. However, German people do not love their jobs as Japanese people do. They finish working by closing time and do not work too much Friday evening. It seemed to me that they live for weekends and holidays, whereas Japanese people live for work and tax payments. Some people working in the laboratory on weekends are originally from Asian countries, such as China or Korea. I heard from a Chinese friend that China has a similar culture to Japan, the so-called “996 working system”, which means that people work from 9 am to 9 pm for 6 days a week. The thought that work does not control life should be respected and spread all over the world. A German friend worked from 9 to 17 for five days, whereas I sometimes worked from 7 to 21, which is illegal in Germany. I cannot finally make sense of why such people working for a shorter time can produce good results. This reason is related to their comfortable lifestyles. They do not think that they have to graduate by a fixed date and do not hurry. This trip to Germany has made me want to try the beautiful study-life balance. I respect this culture

3-2. Enjoyable Culture

As it is famous, German people like beer. Germany is located north of Japan and adopted the summertime system, so it was light until about 10 pm. With longer days, they can catch an idea that they can drink longer. German people like also barbeques. The style of barbeques was also different. Organisers in the laboratory did not offer any food or beverage and did not gather any money. Participants can bring their favourite food and drink, and we share the food with a small description. A friend provided traditional potato salad and I brought Sake. This is a good opportunity to share our own cultures and find new insights. German potato salad did not contain curry powder. I was really enjoying the German drinking culture, of course. As someone said “Auf” which is a cheers sign, other ones said “das Geburtstagskind. Prost!” and drank a bottle of beer. “Auf das Geburtstagskind. Prost!” means “Cheers for the



Figure 3 1L beer with Dresden Frauenkirche

birthday child.” They always wanted a reason for drinking beer and finally found out that every day is someone’s birthday all over the world. They drank beer with the reason that they were celebrating the birthday boy/girl. Because I love beer, there seemed to be the heaven. As I was really enjoying the barbeque and missed taking photos, unfortunately, I cannot share such an atmosphere. Instead, I show a 1 L beer (Figure 3) drunk in front of a cathedral, and beer bottles (Figure 4) I had drunk at home during the stay.



Figure 4 Empty bottles (19 bottles of 500 mL)

3-3. Baked Cake

I was surprised by the German celebrating culture. In Japan, friends or family celebrate a birthday person with cakes they bring. In German, the birthday person has to bring cakes by themselves to be celebrated. As the group consists of over 40 people, I could eat a variety of cakes every week. Unfortunately, I had no chance to bake birthday cakes to be celebrated, but I tried it for a farewell. Normally, an oven is set in a house and is familiar to European people but unfamiliar to us. With the aid of a friend and a manual, I tried to bake the farewell cakes (Figure 5), a chocolate cake and a lemon cake, which was honestly my first trial. These were really favoured and I feel happy over sadness. I would like to appreciate the friend helping me, who went to a cooking school.



Figure 5 My first chocolate cake and lemon cake

4. Future Plan

Based on this experience, I would like to work in this laboratory again. The excellence of the laboratory is one of the reasons why I want to be back, but this is not only. The staff and friends were really kind to me. The students looked happy. They definitely enjoy research from the bottom of their hearts. I will apply for some scholarships and be part of the beautiful group that produces good results while enjoying it.

5. Acknowledgment

I would like to express my great appreciate to Prof. Stefan Kaskel, Prof. Günter K. Auernhammer, Irena and Leila for acceptance of my stay. Thanks to you, I could realise a short stay in Germany and learn the German culture as I desired. In addition, you gave me an opportunity to have a presentation in front of your students (Figure 6). I was really nervous before the presentation and practiced a lot of times. Fruitful comments from you have further advanced my study. As you always talked after our meetings, I want to enjoy my work. I will do my best to gain a scholarship and complete this work. I also thank my friends in Germany. This laboratory is international and has a lot of people having different nationalities. You all are really kind. You always asked me whether I needed help or not. You invited me to eat Ramen. You enjoyed drinking a lot of beer with me till 3 am (Figure 7). You looked for hedgehogs for me at midnight. You helped me to learn German gently. Without your kindness, I would go back to Japan just for weeks. Especially, the last month was so much fun that I really did not want to leave. I always miss you, but we have to see you again. Thank you, friends! Finally, I appreciate the JGP program. This stay is like a dream for me. I could broaden my horizons and will be highly motivated to do research.

Herzlichen Dank!

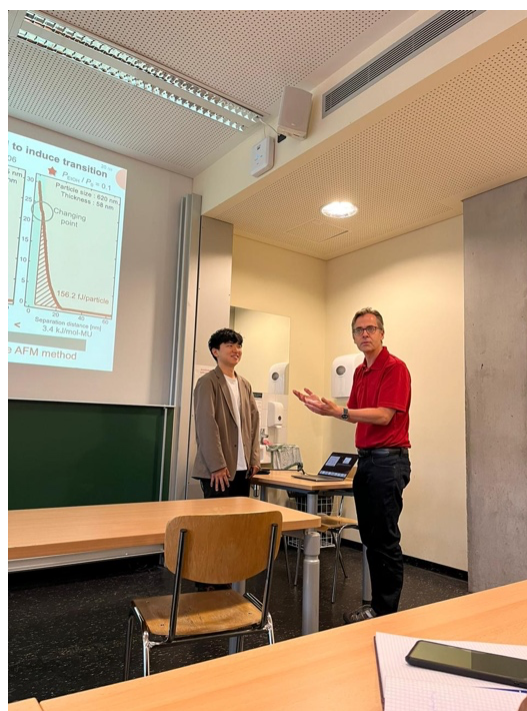


Figure 6 With Stefan after a presentation



Figure 7 Beer party with kind friends