

If I would describe 2021, it would be the year where we learn how to cope. 2022 will be the year we finally see the light of the seemingly never-ending tunnel. We hope these passages could be a lucky trinket to kick off this new year on a good note.

So, what is inside Santa Claus's favorite newsletter you might ask. Well, I am glad you asked because this winter we covered some Sendai's delicacies, gyutan and miso. Santa Clause is also pleased to announce his new little helper, the new FGL Community Mascot. Then, we will dive into the mind of our own AMC professor, Brian sensei, and our recently graduated Duy senpai.

Written by Carlos

Contents

2 | Ask Sensei

5 | Research from Alumni

6 | Local foods in Sendai

10 | Mascot Contest Announcement

Follow us on SNS!



@FGL_COMMUNITY_



TU FGL COMMUNITY



Ask Sensei

Assoc. Prof. Brian Breedlove AMC Professor

Interview by TK, Shin

Could you tell us a little about yourself?

I was born and raised in Kansas City, Kansas in the US but I haven't been there in a long time. I went to a small all male school in Indiana- Wabash college. I majored in Chemistry and had a minor in Computer Science. I probably chose Chemistry because at that time, my school believed that one had to major in Math to take a Computer Science Minor.

I obtained my master's in Chemistry at the University of Minnesota. I worked on "Carbonylation". Our goal was to find a better way of making the initial material for plastic, which was Phosgene at that time. It is a dangerous nerve agent that will kill you instantly. However, during my studies, I did not find a project to do my Ph.D as most of the work had been completed by the researchers before me. Allow me to back track a bit. I was very excited by CO₂ chemistry during that project because one intermediate looked like CO₂ which cooperated in the molecule. I thought, "That's kind of cool!". However, this research was continued by a graduate and her research did not match my intentions. I am glad that I left that project.

I returned to Purdue University, Indiana where I obtained a bachelor's. I worked for a famous professor and became his final student as he moved to San Diego. I then had the opportunity to come to Japan on a business trip for a presentation. It's here that I learnt about the JSBS program-a post-doctoral fellowship program for foreigners. I found a kind boss at the University of Osaka by the name of Kiyoshi Sobe. My fellow colleague and PhD advisor, Tasuki Ito invited me to Sendai for a job. I went after my post doctoral fellowship. I then moved to Waseda University where I began editing for a private chemical society in Japan. The Center of Excellence at Tohoku University wanted more Nobel Prize winners from Japan and international interaction at their Institution. Yamata-sensei brought me back to the G30 program for the AMC program which was established as part of the FGL program in 2007. I've been content and quite lazy to move. I have seen development and met new students with many different ideas and learnt about the different cultures. I am now focused on looking at the electrocatalytic reaction of CO₂ using a catalyst which is redox-active to provide electrons to CO₂ to turn CO₂ to make it something useful.



Ask Sensei

What made you choose chemistry?

As you can see, I enjoy chemistry and chose it over computer science. The root cause is that I met a chemistry teacher when I was young and he made it really exciting for me. Especially his way of teaching, it also made me understand why it was fun. Like when he taught me about the substitution of benzene, he brought donuts for everyone, and he also gave everyone toothpicks and candy. He put toothpicks in candy and that's a great visual way of understanding chemistry and learning chemistry. Since then, I have always enjoyed the subject.

Why Tohoku if not by a chance?

To make it clearer, before I went on a business trip, I met Senpai, who is 71 now. He came to my PhD lab in the summer program. I had a good and enjoyable time with them. After that I had a chance to come to visit Japan. And I have found it very easy to live in, quiet, peaceful and such a relaxing place.

My father's idea was to have his kid live a life outside the hometown. This is the second reason. Finally, it is what I want to do. I first wanted to stay in Japan a bit longer than I had intended to. I'd been to this University with Ito-sensei once before. Sendai suited my idea of a big city- easy to live in, convenient. I find Tokyo a bit too noisy, a bit too busy. And I really want to go back to teaching. The COE and the Global excellence staff invited me, along with Yamata-sensei's invitation. I wanted a change from my editing job. All that said, Sendai is an easy place to move around and it suits me.

What is the best thing when studying chemistry? What do you find exciting about it?

The best thing when doing research is getting positive results for me, and also, I like solving problems but I don't like to call it a problem. It's kind of an idea and understanding how it works. From when I was a kid, I always wanted to know how things work as existing characteristics. "How can we put things together and it work" as another meaning. I have a lot of interest in CO₂ which is found everywhere and it is the molecule that is breathed in and out of almost everything. I want to utilize it and that is now my research interest. In the end, I'm the person who likes challenges and learning things and chemistry provides me with that from my interest.

Ask Sensei



Do you recommend studying for a master's degree or not?

It depends on what you want to do, your requirements.

Generally, either you want to just work in a company, or just want to do some basic research. A master's degree is a good idea for the latter. However, a master's degree can give you, first, more experience than the undergraduate and second you can get a higher salary from the degree and you don't need to come with much idea but you need to know what you are going to do. In the US, if you want to teach in junior college, it is also good to get a master's degree. In Japan and Asia, a master's degree will help you get a decent job.

- **Graduate school and master?**

For graduate school, graduate school is not for everyone; however, if you have a desire to not just do original research, really going for the challenge of a full graduate program is important too. As a comparison, a master's degree is not so much graduate school as extra-training.

Note : In another way, graduate college degrees typically follow a bachelor's degree and require additional years of study. A master's provides advanced study after the bachelor's that is focused on a specialty or major, such as English literature.

For more info, visit

<https://www.theclassroom.com/difference-between-graduate-masters-degree-6507107.html>

- **Continuum to PhD?**

For me, a PhD is a challenge. To be a good PhD, you need focus and need to expert as much as you can in the specific area.

- **For industrial purpose or entrepreneur pathway?**

Master is also a good pathway to get money, if you want the money but you also need to consider that it will be 2 years with some crankily professors. And if you want to be an entrepreneur, an expert in some region is needed and that is what master and PhD will be recognized for. It may make investors come in more for the project as you are expertise in that field.



What do you want to tell to FGL students?

First, study hard but relax. Second, don't make everything so complicated: as an example, in experimenting, we will change 1 variable at a time, and at the same time learn to look at different angles also.



What do you recommend eating in Sendai?

Go to Shiogama which is considered to be one of the best sushi restaurants because there is a Shiogama fish market. Also go to Ito Unagi (if you love unagi), it will be 5000 yen each for lunch but it's really good.



Describe Sendai in three words

Quite, Green, Easy

Research From Alumni

Synthesis and spectroscopic study of SrNbO₃/SrTiO₃ heteroepitaxial structure

Interview by Dylan Christian Thomas / Written by Duy Khanh Nguyen, AMC 2017

A 4d transition-metal oxide of SrNbO₃ (SNO) has attracted increasing interest as a promising candidate for transparent electrodes in future electronics [1], which can give more efficiency in emitting light especially in LEDs. To engineer electronic devices based on the oxide, it is necessary to investigate its heterostructures with other materials, especially oxide semiconductors. In this research, I have synthesized and characterized heteroepitaxial structures of SNO and SrTiO₃ (STO), which is a well-known oxide semiconductor. I focus on the intriguing behaviors occurring at the heterointerface.

A series of epitaxial SNO thin films with various thicknesses were grown onto STO (100) substrates by the pulsed laser deposition method under the condition optimized for the best stoichiometry and crystallinity. I characterized the physical properties of the heterostructures and found abnormally high conductivities at low temperatures, suggesting metallization of the interfacial STO. To investigate the possible origin of the metallic states, I have performed resonant photoelectron spectroscopy (RPES), as shown in Fig.1. The RPES spectra of SNO (3 ML)/STO show immense enhancement of the density of states near the Fermi level (E_F) at the Ti 2p-3d absorption edge, indicating that the Ti 3d conduction band is largely responsible for the high conductivities. Since Nb is a well-known donor for STO [2], the most likely origin of

the observed phenomena is the charge transfer and interdiffusion between Nb⁴⁺ and Ti⁴⁺ ions around the heterointerface. Thus, the research results suggest that inserting a buffer layer can be a method to prevent STO from metalizing for better property control and prevent them from losing their semiconductivity, especially in designing Schottky junctions in the devices. However, more research will be needed to be able to fully construct devices based on STO.

Currently, I am pursuing my PhD degree at the University of Chicago and although my last research project was not finished, I have hope that the project will be continued by my colleagues in my previous lab. There are some next steps that could be done, such as changing the substrate other than STO or inserting a buffer layer to improve the semiconductivity of STO as mentioned previously. Overall, I am glad to have done this project with my lab members and professors, and I have gained a lot of experience from it.

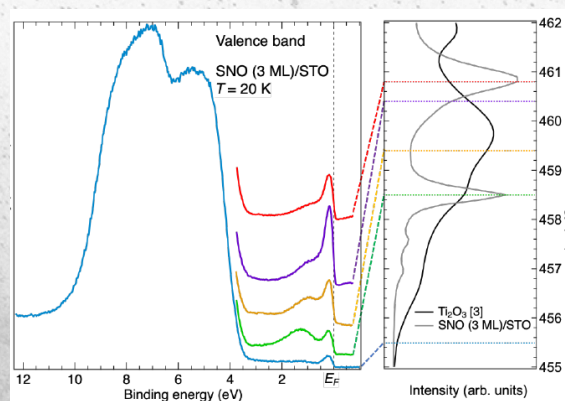


Figure 1. Ti 2p-3d RPES spectra for SNO (3 ML)/STO taken at various photon energies. The Ti L-edge XAS spectrum for the same sample is also shown with that of a Ti₂O₃ film [3] as the reference of Ti³⁺.

Sources

- 1) Y. Park *et al.*, *Communications Physics* **3** 102 (2020).
- 2) T. Zhao *et al.*, *Journal of Crystal Growth* **3-4** 212 (2000).
- 3) N. Hasegawa *et al.*, *Master's thesis, Tohoku University* (2021).

Local Foods In Sendai

Gyūtan (牛タン) and Sendai Miso

Written by Wei-Wei and Rawin

牛タン - Gyūtan

All of Tohoku probably know this dish as a primary introduction to the local cuisine here in Sendai. And it's called “Gyūtan” (牛タン). As its name suggests, Gyūtan is made of a cow tongue. 牛 is read “Gyū” which means “cow”, and タン means “tongue”. According to a source, gyūtan originated in 1948, after World War II, in Sendai. Then, it swiftly gained popularity and spread throughout Japan.

According to Wikipedia, the food was invented by Sano Keishirō, a restaurant owner who served tongue menus since 1948. “Tasuke” (太助) is the name of the restaurant. The restaurant is currently in business. It is still regarded as one of Sendai's top Gyūtan restaurants. Its main branch is in the center of Sendai city, taking about a 5-minute walk from the Hirose subway station.



Local Foods In Sendai

The food grew increasingly popular when Japan's beef import quota was removed in 1991. In fact, a huge percentage of the beef tongues served in Sendai were imported from the United States, not the other way around. Some even claim that American beef has the right amount of fat for Gyūtan, and they refuse to use Australian beef.

In Sendai, you can have Gyūtan in many different ways — grilled, curry, stew, bento, and as a meal set (Teishoku) in a restaurant. In a restaurant, grilled Gyūtan is usually served with oxtail soup, barley rice, and pickles. If you are in Sendai and wish to welcome someone to the city here, we highly encourage you to let them try this famous local dish.



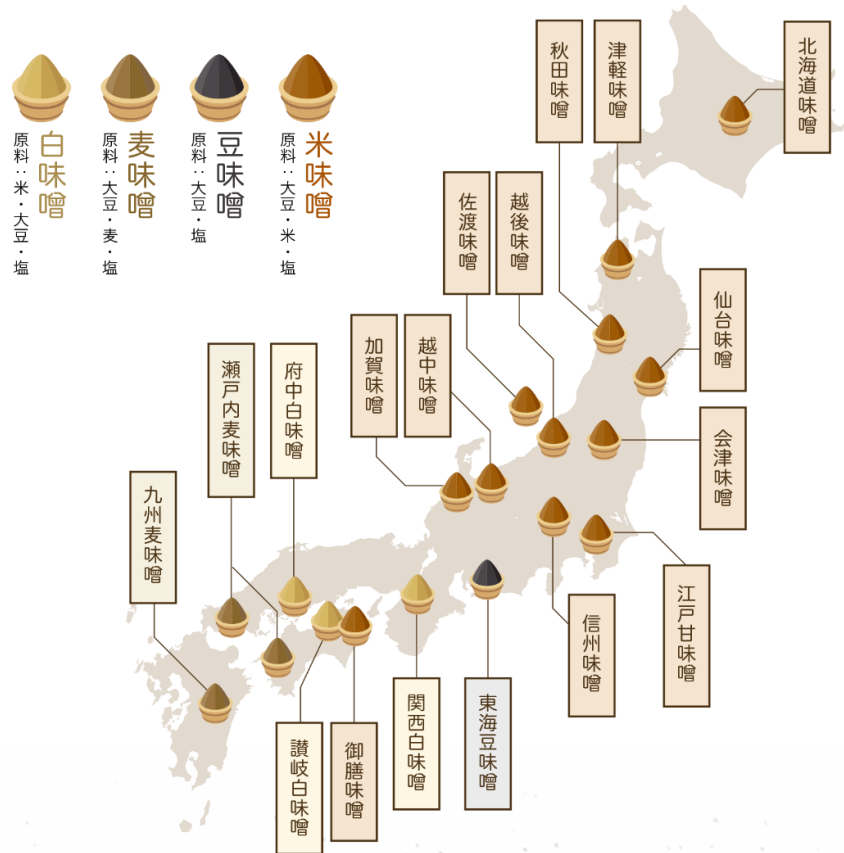
Gyūtan served as a set meal.

Source: <https://tabelog.com/en/kanagawa/A1409/A140901/14078961/dtlphotonst/1/?smp=s>

Reference : <https://en.wikipedia.org/wiki/Gy%C5%ABtan>

Local Foods In Sendai

味噌 - Miso



If you have tried Japanese cuisine before, you are likely to have drunk miso soup (味噌汁). Miso soup is part of the staple diet here in Japan. Since it is a universal food all over Japan, it is possible for you to find many kinds of miso in different parts of Japan. In Sendai, Sendai miso was invented 500 years ago and is well-known in different regions.

In the 1580s, Date Masamune(伊達政宗) and other samurais marched off to Korea to wage war with Koreans and Chinese. During that period, Japanese soldiers would bring food and seasoning such as Miso to the battlefield. However, miso made in regions other than Sendai spoils easily in the Summer. Among them, only the miso made in Sendai could keep its original quality and taste wonderful. Thanks to this, Sendai miso became well known to people from all walks of life. Date Masamune built the equipment used especially for making miso. This indicates how important Sendai miso is to people living in Sendai.

Reference: <https://www.marukome.co.jp/miso/type/>

Local Foods In Sendai



If you want to try Sendai miso, first, you can visit the place such as ramen store to find the ramen using Sendai miso. Compared to the white miso originated in Kyoto, Sendai miso belongs to red miso, which is relatively saltier than the former one. As a result, its flavor is richer than the normal miso ramen.

After having a try, you might wonder where you can buy it. Usually, you are able to find it in almost every supermarket in Sendai. When cooking, miso can be used for cooking miso soup, marinating meat/fish, or even making dessert. Since Sendai miso is saltier than other kinds of miso, be sure not to add too much miso into your food. Let's enjoy the miso!

Congratulations to our winner of the
FGL MASCOT CONTEST !

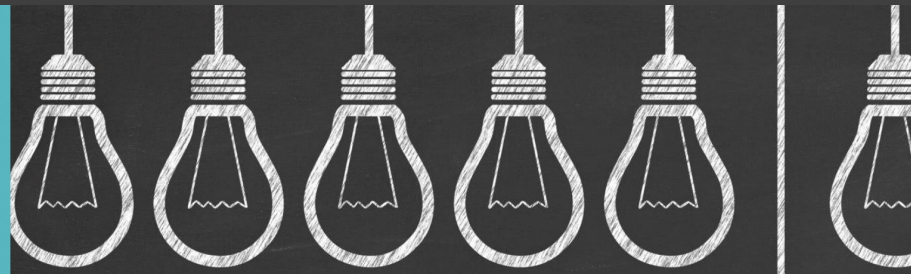
Koo Sera (IMAC-U2020)



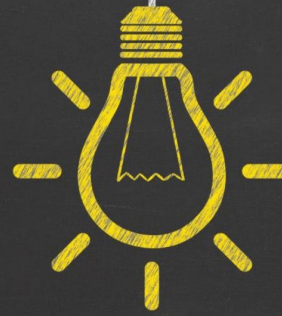
"As for the inspiration to my Mascot character, I tried to think of a way to represent a new beginning. I wanted to combine this idea with the fact that we are an international community. With that, I give you a globe and a sprout!"

Recruiting New Members!

Join the FGL Community
Committee to make a
difference in the FGL Family



Fill this form!



[Click here to become a member now!](#)



SCAN ME