

JSPS Short Term Invitation Fellowship: Post-Visit Summary Report

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JSPS ID: S16064
Host: Dr. Masashi Ishii, National Institute for Materials Science (NIMS), Tsukuba, Japan
Visit duration: 31st July to 27th August 2016

My host and I have been collaborating since 2012 on research related to characterization of non-radiative quenching mechanisms (in order to better understand the efficiency limiting processes) in materials used for the fabrication of LED, Laser and photovoltaic devices. In recent years we have co-authored 4 papers in international peer-reviewed academic journals (Applied Physics Letters, Journal of Applied Physics and Japanese Journal of Applied Physics) and this fellowship provided an excellent mechanism for us to continue our fruitful collaborations on a formal basis.

Whilst in Japan, I was based in the **Surface Physics and Characterization Group in the Research Center for Advanced Measurement and Characterization at the National Institute for Materials Science (NIMS)** in Tsukuba. I stayed at Ninomiya House (a JST managed apartment block for visiting researchers), located just 5 minutes' walk from NIMS Senegen site. Tsukuba is known as 'Science City' as it boasts a high density of Universities and Research Institutes. It has a medium size centre with excellent amenities and with a large community of ex-pat and visiting researchers, year-round, it is an excellent, family-friendly social environment. Transport links are very good with the Tsukuba express train taking just 45 minutes to Tokyo.

During my first week at NIMS I was invited to give a Seminar on my recent research activities as part of the **'Advanced Materials Characterization Project (AMCP)'**, which was attended by other academic and industrial researchers from NIMS and around Tsukuba.

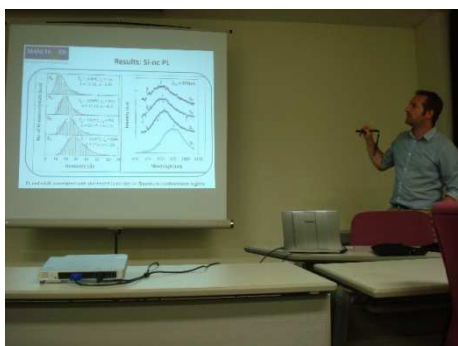


I was also given a tour of the **Photon & Ion Beam Physics Group Laboratory at NIMS Sakura site**, just a short bus ride away.



During the latter part of my stay, my host and I did a tour of the Southern region taking in the spectacular sites of the historic cities of **Kyoto, Nara, Osaka and Kobe.**

A workshop on **'Solution to quenching problems of nano opto-electronic materials in international framework'** was organized by my host and colleagues from Kyoto University (attended by around 60 participants), at which I gave an Invited talk and was later given a tour of the facilities in Kyoto.



From there we went on to visit the group of **Prof. Minoru Fujii in Kobe University**, with whom I have many shared research interests, mainly in the area of silicon nanostructured materials. Here I was also given a tour of facilities and gave a seminar on some of my recent research on **Erbium doped silicon nanocrystals**. Later that evening we were treated to a banquet style dinner in **Kobe Port area** where we able to take time to discuss possible future

collaborations.

In Osaka, we visited the laboratory of **Prof. Yasufumi Fujiwara** who are developing inexpensive 'red' LED materials based on rare-earth (Eu) doped Gallium Nitride and novel photonic crystal cavities for improved device emission efficiency.



We rounded-up our trip with a visit to the **Institute of Scientific and Industrial Research at Osaka University** where we were given a tour of the labs and held discussions on nano-materials for future solar energy systems (photovoltaics and battery technologies), with **Dr. Taketoshi Matsumoto**.

Overall the short term (1 month) fellowship provided ample time for new experiments and visits to a number of labs to discuss new potential collaborations with leading researchers in my field. I anticipate this leading to at least one new joint publication (with my host) and through the sharing of samples, research ideas and techniques, fully expect that my network of collaborators in Japan will now grow considerably.