Institut de Chimie Moléculaire et des Matériaux d'Orsay

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20 January 2022, Orsay

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I, Claudia DECORSE, associate professor at Paris-Saclay University and researcher at the ICMMO institute at Orsay, France, **I received in my laboratory from 5 to 19 January 2022 the following graduate students** who participate the BK project in Ewha Womans University (Graduate Program in System Health Science and Engineering funded by the National Research Foundation of Korea).

List of students from Ewha Womans University:

1) Yujin CHO

2) Soyoung HEO

3) Ha Heun LEE

During this period the students fully participate to scientific training and research work as described here after:

Miss **Yujin CHO** work on *"YIG (Yttrium Iron Garnet) and YIG-derived materials"*. First, a crystal of YIG synthesized in Korea, at 2D materials Laboratory in home university was characterized by the means of X-ray diffraction. Laue back-scattering X-ray diffraction technique was used to orient a YIG crystal. The oriented crystal was then cut with particular orientation by using a diamond-wire cutting system and the oriented surface was polished down to 1 micron diamond-polishing suspension to obtain mirror surface. A small piece of the same crystal was grinded and powder X-ray diffractogram was recorded to complete the characterization. This particular prepared samples are necessary for further characterization performed in home university. Second, YIG-doped powders also synthesized at home university were characterized by X-ray diffraction, and the data were analysed to detect whether the compounds were single-phased. Then the student prepared feed-roads of this powders (cylindrical shaping by compressing with an isostatic press and high temperature thermal-treated) in view of crystal-growth of YIG-doped compounds at 2D materials Laboratory in home university.

Miss **Soyoung HEO** and Miss **Ha Heun LEE** work on *"Synthesis and characterization of non-stoichiometric Ti-O systems"*. First, powders of several particular compositions in the non-stoichiometric Ti-O system and prepared in home university were characterized by the means of X-ray powder diffraction (XRD). The X-ray data were analysed to check whether the suited reduced Ti-O phases were reached and whether the samples were single-phased. Taking in to account XRD results students under my supervision decided to adjust the initial synthesis conditions and test new-ones during the visit. For this purpose, students performed a series of thermal treatments and new synthesis by changing several parameters as: reducing atmosphere (Ar and H2-Ar mixture), temperature, duration and starting powders mixtures (choice between metallic Ti, Ti_2O_3 or TiO_2). The new synthesis were followed by XRD and diffractograms were recorded at the end of each thermal treatment. A first rapid analysis of XRD was performed, the impact of different parameters could be evaluated and some new synthesis conditions could be set. A more in-depth analysis of these XRD data will be carry on at 2D materials Laboratory in home university and synthesis conditions for each reduced Ti-O phase will be then fixed. These results allow also to propose a crystal-growth strategy for the next step of the research project.

This short scientific training and cultural exchange is a part of the PHC STAR 2021, Project No. 45760QA, in the framework of the scientific cooperation between SP2M team of ICMMO at Paris-Saclay University, under the responsibility of Claudia DECORSE, associate professor (FR PI), and 2D materials Laboratory in the major of System Health Science and Engineering at Ewha Womans University, under the responsibility of Suyeon CHO, assistant professor (KOR PI).

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