Returnee's Report

Name：	Sungho LEE
Status：	PhD year 3
Name of Exchange University：	Imperial College London
Research Theme：	Characterization of calcium/strontium-containing sol-gel-derived 58S glasses.
Duration：	2013/ 10/7~2014/1/4 (90days)
Exchange University Faculty Advisor：	Reader Julian R. Jones

Research Theme in detail：

<Goal>

Characterization of 58S glasses ($60SiO_2 \cdot 36CaO \cdot 4P_2O_5$), substituting CaO with SrO: In this composition, phosphate and silica network tend to separate. Therefore, source of phosphate in the sol-gel glasses TEP (Triethyl Phosphate), which is widely-used for phosphate source, and DEPETES (Diethyl phosphato ethyl triethoxy silane), which consist of Si and P connected with ethylene group, were used. Prepared glasses were evaluated with FT-IR for their structure and ICP-AES for ion dissolution amounts in Tris buffer solution and simulated body fluid (SBF).

<Result>

The glasses prepared with TEP shows more sharp peaks in P-O bending attributed to ortho-phosphate group (560 ~ 620 cm^{-1}), compared to DEPETES ones. Si-O non-bridging oxygen group peaks increased and Si-O-Si peak shifted with increasing SrO content of the glasses. Phosphate ion dissolution amounts in Tris buffer solution of SrO 0 ~ 50% substitution samples decreased until 0 ppm, and also confirm hydroxyapatite-like crystal on the glass surface with SEM observation. But in the case of SrO 75 ~ 100% substitution samples, no decrease of the dissolution amounts was observed and no hydroxyapatite-like crystal formed. FT-IR results after soaking, Si-O non-bridging oxygen peaks disappeared, which means dissolved. In the case of soaking in SBF, the almost same results were also obtained in Tris buffer solution.

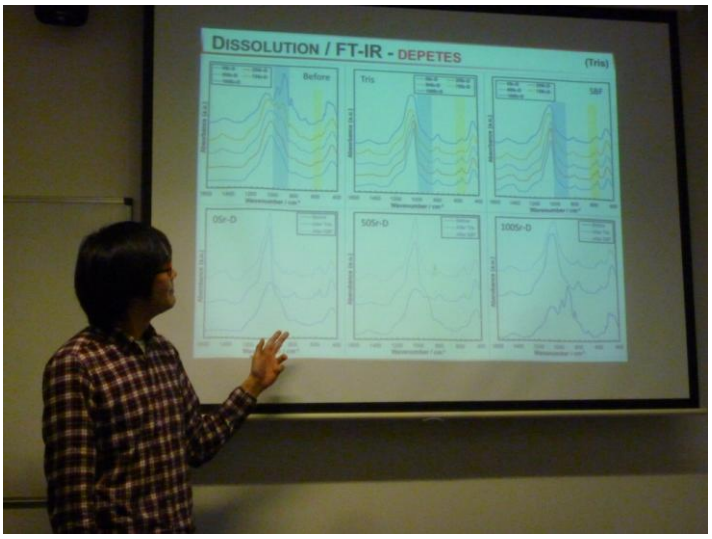
About the laboratory I was sent to（number of faculty and students, methods used in research activity:

- Supervisor : Julian R Jones (Reader in Biomaterials)
- Member : PD - 4, PhD - 11, Master - 2
- Style of research activity
  - Discuss about predictable results before experiments.
  - Make a risk assessment form before every experiment.

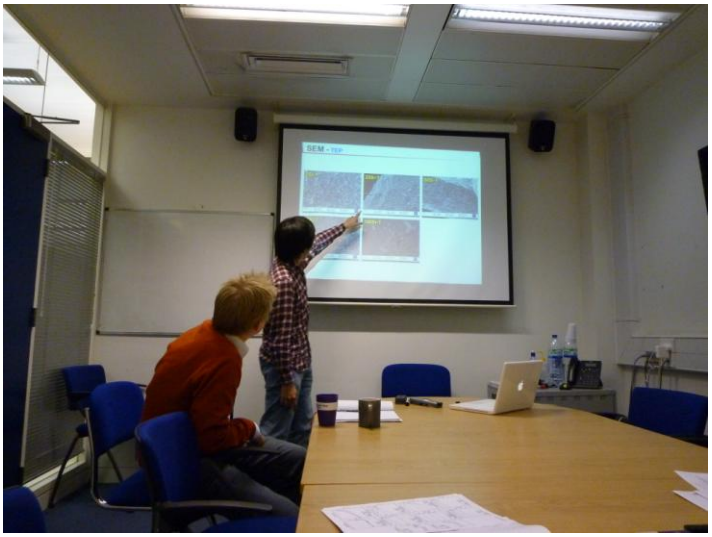
Comments about the workshops and seminars I attended：

- Sol-gel Meeting in UCL (28/11/13)

My Ambitions： I will submit a paper on my work in ICL. Due to the short term stay, some parts of experiments need to do in NIT and ICL under cooperation. I will keep in touch with ICL researchers and I want to make progress of our collaboration.
Advice and suggestions for young researchers who will go to exchange universities ： For safety, we can’t use any machines by ourselves. For using machines, we have to discuss and negotiate with PD or PhD students at an early stage. The use of some machine may not be permitted during our stay.



Group Meeting -1-



Group Meeting -2-

Christmas Party