

## Returnee's Report

Name :	Masaki TSUTANI
Status :	Masters year 1 Nagoya Institute of Technology
Name of Exchange University :	Imperial College London
Research Theme :	Synthesis of Na-geopolymers using artificial seawater
Duration :	2013/ 9/4~2014/2/28 (178 days)
NITECH Faculty Advisor :	Associate Professor Shinobu Hashimoto
Exchange University Faculty Advisor :	Dr. Luc J. Vandeperre
Research Theme in detail :	
<Goal>	
<p>Firstly, the effect of sodium chloride, which is the main component of sea water, on the strength of geopolymers was investigated for both as-produced samples and for samples which had been immersed to water for up to a week as a preliminary experiment. In a second phase of the research, samples were produced using simulated sea water and again the compressive strength after production and after immersion in water were determined.</p>	
<Result>	
<p>It is found that the sodium hydroxide concentration needed for a given compressive strength reduces when NaCl is used and that water exposure leads to a small decrease in compressive strength during short term exposures. This knowledge is then applied to the series of samples produced with simulated sea water.</p>	
<Achievement>	
<p>In the preliminary experiment, compressive strength increased with amount of NaOH. But excess of NaOH led to low compressive strength. It was observed that NaCl had a potential to improve compressive strength. On the ground that degradation on compressive strength of the samples with immersion stopped at the 3<sup>rd</sup> day of immersion, it is considered that leaching of ingredients such as Na cations and Cl anions from the samples stopped at the 3<sup>rd</sup> day.</p>	
<p>From the above results, it revealed that compressive strength can be improved by adding salts such as NaCl as raw materials for the synthesizing of geopolymers. It indicates that seawater has the potential to be used in the making of geopolymers</p>	

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

Number of faculty and students: about 10.

Method used in research activity: My group does not have a meeting regularly, but we need to make an appointment with our supervisor for a meeting. In my case, I had a meeting once every week.

Comments about the workshops and seminars I attended:

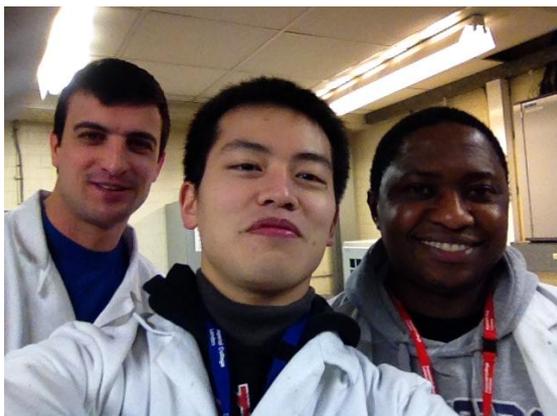
- Centre for Advanced Structural Ceramics(CASC) Summer School 2013
- English class for academic visitors

My Ambitions:

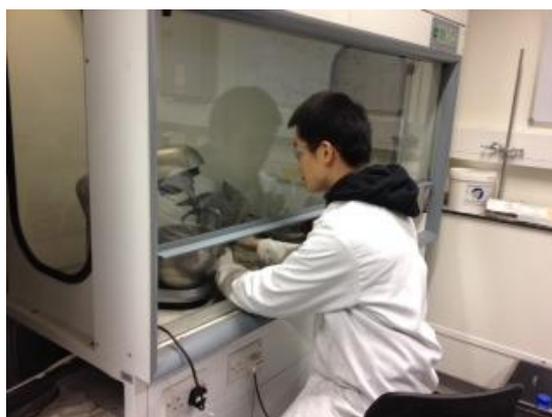
Firstly, synthesizing geopolymers using fly ash from Hekinan thermal power plant and artificial seawater and conducting characterization of the samples. Secondly, Using real seawater for synthesis geopolymers, and conducting characterization to evaluate salts in seawater on properties of the samples and reveal the mechanism.

Advice and suggestions for young researchers who will go to exchange universities :

What is the most important thing is communication with others. Even if you cannot sentence, you should speak words with a dictionary. I would suggest that you interact as much as possible with other students. This will help to improve your communication skills in a foreign language. Also, this helps to build networks that will be useful when you have difficulties with your research. If you have difficulty with any aspects of your research, do not hesitate to ask others for help. If you tell them the objectives and the reason why you need it, they will help you.



With my friends



During the experiment