THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING
土木及環境工程學系
CEE

Engineered Calcium Aluminate Cementitious Composites (ECAC) containing Waste Glass Cement Material

Associate Professor Marjorie Valix

School of Chemical and Biomolecular Engineering, The University of Sydney, Australia

marjorie.valix@sydney.edu.au

ABSTRACT

Calcium Aluminate Cements (CAC) is a specialty cement material with a main constituent of calcium aluminate. This material has a wide range of application in both the construction industry and as a sacrificial protective lining against corrosive environment because of its ability to gain early strength and its resistance to aggressive chemical environments and temperatures. Its long-term application however is hampered by its conversion process. The key issue with CAC conversion is that it releases water bound by the metastable hydrates and if this is lost to the system it increases its porosity that subsequently raises its susceptibility to corrosive attack; where full conversion can result in as much as 5-8 times increase in the rate of corrosion. Therefore, controlling and understanding the rate and the processes that affects the mineralogical transformation such as conversion during the CAC service are critical in the effective use of CAC as a mitigation strategy against microbiological attack. Engineered calcium aluminate cementitious composite (ECAC) is a special type of high-performance concrete designed to achieve high damage tolerance and high durability under service conditions. To achieve these unique properties, the ECAC mixture design has been optimised using a heterogenic matrix that includes cement and mineral admixtures. In this study, we examined the role of waste glass as supplementary cementitious material SCM (in the form of waste glass powder) in arresting the conversion and improving the durability of CAC in chemically aggressive conditions. The ECAC mortars demonstrated both greater resistance to both abiotic and biogenic sulphuric and citric acid attack in comparison to the cubic hydrates and high early. This project in addition contributes to the sustainable management of waste glass from E-wastes by saving natural resources and preventing ecological damage from the disposal of glass through the valorisation of glass waste into cost effective construction materials.

Date: **9 January 2018 (Tuesday)**

Time: **17:00 – 18:00**

Venue: **Room Z406, 4/F, Block Z,**
The Hong Kong Polytechnic University,
181 Chatham Road South,
Hunghom, Kowloon

SPEAKER'S BIOGRAPHY

Associate Professor Marjorie Valix is an Associate Professor, currently the Director of the Material and Mineral Processing Research Unit (MMPRU) in the School of Chemical and Biomolecular Engineering at the University of Sydney. She is also currently the Associate-Dean Courses for the Faculty of Engineering and IT. Associate Professor Valix has led leading research for over 16 years in mineral and materials processing with a particular focus on mineral activation, biohydrometallurgy, re-processing of wastes and microbiologically induced corrosion. Her research has contributed substantially to the emergence of new tools and technology − the use of in-situ synchrotron based analysis of mineral reactions and understanding organism interactions with minerals and wastes. These are currently being implemented in several industrially supported projects and in particular a national concerted effort to develop the corrosion abatement technologies to protect Australia's water and waste infra-structure. She has 141 publications, 5 patents and co-recipient of various awards including 2014 - Asia Pacific Regional IWA Project Innovation Award in Applied Research and 2014-Global Award IWA Project Innovation Award in Applied Research.

***** All Interested Are Welcome *****
For further information, please contact Dr. Dan Tsang at Tel. 2766-6072.
Free Admission. Certificates of attendance will be provided to participants if they attend the whole lecture.