The Hong Kong University of Science and Technology
Department of Chemical and Biomolecular Engineering

Seminar
Catalysts and catalytic processes scale-up at Teesside University
by
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The development and improvement of processes for the conversion of biomass and waste into energy/fuels and value-added chemicals, via heterogeneous catalysis, is one of our major research interests at Teesside University and, at the same time, one of the challenges in fundamental and applied chemistry. Newly-developed catalysts are economically viable only if they can be used in industrial, large-scale processes. But scaling-up from laboratory-scale experiments to industrial scale processes is not just amplification of a new catalytic reaction. Heat and mass transfer have to be taken into account as well, along with the, sometimes, difficult process of shaping the catalyst. Thus, improved modelling, novel reactor geometries and concepts, optimisation of the catalyst’s powder shaping process and realistic cost estimates are required.

All these aspects were addressed within our PYROCHAR (PYROlysis based process to convert small WWTP sewage sludge into useful bioCHAR) project, which had received funding from the European Union’s Seventh Framework Programme managed by the Research Executive Agency. Our role was to develop efficient and selective catalysts for tar reforming in order to improve the quality of the pyrolysis gas, foreseen to be used in a gas turbine to produce electricity. As such, the PYROCHAR system will reuse the calorific power of the sludge to fuel its own system, increasing the energy efficiency of the overall system.

The main topic of this seminar is the optimisation of the scale-up process of the newly-developed catalysts. The catalysts were mainly SBA-15 supported Ni catalysts. The viability of the shaped catalysts for the tar reforming at industrial scale was assessed by comparing the physical and chemical characterisation results of the powder and shaped catalysts.

Date: 08 January 2016 (Fri)
Time: 10:30am
Venue: Rm 5564 (Lift 27/28)

~ All are Welcome~