



Chemical Engineering

School of Engineering and Physical Sciences

PhD Studentship –Pyrolysis of Polymers into Hydrocarbons

Fixed term for 3 years

£ 13,590 per year

Co-supervisors:

Prof Raffaella Ocone, Heriot-Watt University and Dr Ondřej Mašek, University of Edinburgh

Applications are invited for a three year PhD position, supported by the Scottish Energy Research Academy and Nextek to be undertaken within Chemical Engineering at Heriot-Watt University.

The project will address an area related to the environment and sustainability, i.e., waste recovery by pyrolysis. This is a rapidly developing field with a growing relevance to industry, as demonstrated by the strong industrial support for this project. Pyrolysis is a process increasingly employed for thermochemical conversion of wastes and recovery of lower molecular weight hydrocarbon products to be used as fuel or chemical feedstock. The optimisation of the process demands knowledge and control of the kinetics of pyrolysis for accurate predictions of the products' distribution.

The research will consist in developing a model for the lumping kinetics approach (e.g., Astarita, G and R Ocone, *AIChE Journal*, **34**, 129, 1988) for the pyrolysis of selected waste recovery residues and successive fractionation of the liquid products. A discrete lumping methodology will be applied to the three product streams (lumps) resulting from the pyrolysis of wastes, i.e., pyrolysis gases, liquids and char. The fractionation of the liquids (bio-oil) will be described through a continuum lumping approach. The work presents a number of scientific challenges: firstly, the kinetics of plastics pyrolysis must be elucidated; additionally, the fractionation of the bio-oil would present an "apparent" kinetics of the multi-component mixture which is not simply explicable through the kinetics of each single reaction.

The project will combine desk-based modelling work with experimental work to achieve its objectives to be carried out at the UK Biochar Research Centre at University of Edinburgh, co-supervised by Dr Ondřej Mašek. The experimental work will focus on providing inputs to models that are otherwise not available and at later stage it will be used for verification of model results.

Closing date: 9 March 2012

Informal enquiries and application to be sent to Prof Raffaella Ocone (r.ocone@hw.ac.uk,
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