



Quo Vadis Chemie

Biodegradation, Atom Economy and Green Toxicology: Tools for Sustainable Chemistry and the Design of Safer Chemicals



which will be delivered by

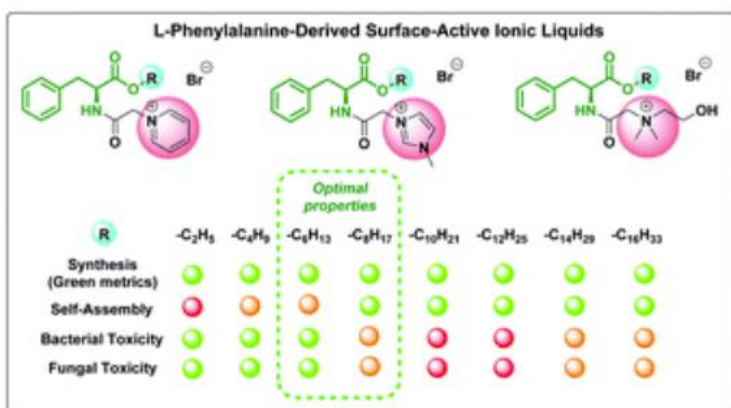
Prof. Nicholas GATHERGOOD

Joseph Banks Laboratories, School of Chemistry,
University of Lincoln, Lincolnshire, UK

on 27.03. at 15:00

the Lecture Hall CH2, the School of Chemistry Building, FoS CU, Hlavova 8, Praha 2

Abstract: Sustainable chemistry research projects usually combine many fields of green chemistry; ionic liquids, eco(toxicity) assessment and the 'benign by design' approach.¹⁻⁴ One such study is directed towards ionic liquids which can also catalyse reactions.¹ This overlap between organocatalysis and ionic liquid research enables us to design low toxicity and potentially biodegradable catalysts based on the extensive biological screening data of ionic liquids. Assessment of the performance of a new catalyst, in tandem with the (eco)toxicity screening and biodegradation testing allows the chemist to develop greener synthetic methods. A library of aprotic ionic liquids which can act as Brønsted acid catalysts without high antibacterial and antifungal activity has been designed. Biodegradation of the novel ionic liquids was also investigated in the CO₂ Headspace test (ISO 14593). Our work includes green chemistry metrics feedback



and investigates the effect of substitution on the imidazolium ring on biodegradation, toxicity and activity of the catalyst. This enables our team to recommend the 'greenest' catalyst of our series for further applications. The second part of the talk will introduce how the lessons learned from the catalysis project directed our project to design biodegradable and low microbial toxicity cationic surfactants. We propose that these case studies can be used as a road map to design safer chemicals.