

# REGIONAL CENTRE OF ADVANCED TECHNOLOGIES AND MATERIALS LECTURES

Monday, April 11, 1:00 pm

Seminar room of RCPTM (room No. 314), Šlechtitelů 27, Olomouc

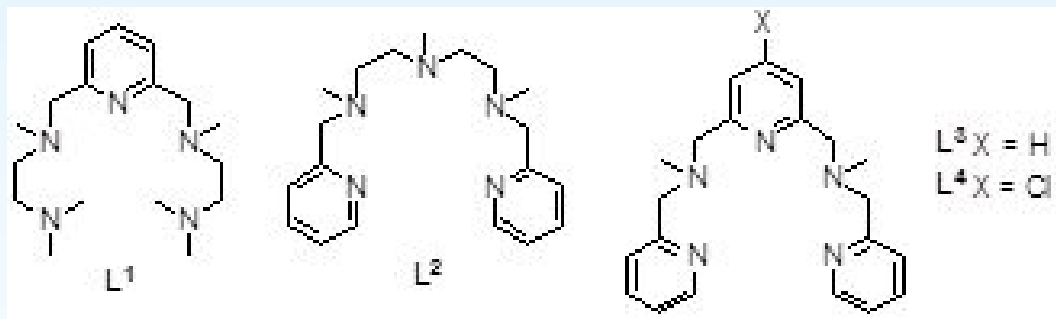


**Dr. George Britovsek**  
(Imperial College London)

**Imperial College  
London**

## „Towards Robust Iron-based Catalysts for the Selective Oxidation of Alkanes”

**Abstract:** The selective oxidation of organic molecules under energy efficient, cheap, non toxic and environmentally friendly conditions is an important target for the chemical industry and organic synthesis on laboratory scale. In nature there are metalloenzymes such as cytochrome P450 or methane monooxygenase, which feature iron complexes at the active site and perform excellent regio- and stereoselective oxidation catalysis. Inspired by the reactivity and selectivity of metalloenzymes, a large variety of non-heme iron(II) complexes featuring linear, tripodal or cyclic tetradentate N-donor ligands have been developed. A key finding has been that catalysts with tetradentate ligands tend to give the most active catalysts. However, rapid degradation of most catalysts under the operating conditions presents a major problem.



To establish whether catalyst stability is affected by an increase in ligand denticity, we present here our results on mononuclear non-heme iron(II) complexes containing linear pentadentate ligands (L1-4). The reactivity of these complexes as catalysts for the oxidation of cyclohexane with hydrogen peroxide has been investigated. Analysis of the different complexes revealed interesting spin crossover behaviour and unusual change in the coordination geometry from octahedral to pentagonal bipyramidal. Furthermore, in solution it was found that the pentagonal bipyramidal complex changes its coordination geometry with temperature resulting in a novel temperature-dependent coordination equilibrium.