Module name	**Smart Molecules – Ionic liquids: From physical properties to applications**
Number	**2011-M05**
Aims	This module aims at giving a basic background of ionic liquid research. Links between different IL disciplines like molecular sciences as well as topics from industry and physics, homogeneous, heterogeneous, and bio-catalysis shall be provided.
Basics	Ionic liquids: From physical properties to applications
Contents	Ionic liquids are entirely composed of ions and are usually in the liquid state at or close to room temperature. The attraction of ionic liquids (ILs) lies in their remarkable set of properties when compared to other conventional solvents. Both anion and cation can be independently selected to tune the IL's physicochemical properties (melting point, conductivity, viscosity, density, refractive index, etc.) while at the same time introducing specific features for a given application. Ionic liquids offer many opportunities for sustainable production, storage and efficient use of energy and are often suitable as components of advanced devices and processes. 1.) Basics about ionic liquids 2.) Physics of ionic liquids 3.) Handling ionic liquids and their synthesis 4.) Application of ionic liquids
Methods	Synthesis; Characterization of IL properties by different spectroscopic methods (IR, NMR, UV-Vis, etc.).
Type	Two-day block course / 12.-13. October 2011
Work load	15 hours presence / 45 hours self-study
Examination	Written exam: 21 October 2011, 08:30-09:15 a.m., SR 014
Credit points	2
Responsible scientists	Hey-Hawkins, Kirchner, Kremer
International guest lecturers	Prof. Dr. Andrew Abbott (University of Leicester), Dr. Maggel Deetlefs (The Queen's University of Belfast), Prof. Dr. Frank Endres (University of Clausthal), Prof. Dr. Kenneth Seddon (The Queen's University of Belfast etc.), PD Dr. Annegret Stark (University of Leipzig), Dr. Veronica Strehml (University of Potsdam)
Industrial partners	Prof. Dr. Klemens Massonne (BASF, Ludwigshafen)
Recommendations for literature	Basic textbooks on ionic liquid research: 1. An Introduction to Ionic Liquids, Michael Freemantle, Royal Soc of Chemistry 2. Ionic Liquids in Synthesis (Green Chemistry (Wiley)), Peter Wasserscheid, Thomas Welton 3. Handbook of Green Chemistry: Ionic Liquids v. 6: Green Solvents Peter Wasserscheid, Annegret Stark, Paul T. Anastas 4. Ionic Liquids: From Knowledge to Application (Acs Symposium Series) Natalia V. Plechkova, Robin D. Rogers, Kenneth R. Seddon Review article: 1.) A. P. Abbott, G. Frisch, J. Hartley and K. S. Ryder, Green Chem., 2011, 13, 471-481

SCHEDULE for Module 2011-M05

Time	Lecturer	Programme	Location
October 12th, 2011			**Chemistry building**
9.00-10.30	Kenneth Seddon	Introduction to ionic liquids	SR 014
10.30-11.00		*Coffee Break*	
11.00-12.30	Andrew Abbott	Ionometallurgy - Processing of metals using ionic liquids	SR 014
12.30-13.30		*Lunch*	
13.30-15.00	Malgorzata Swadzba-Kwasny	Inorganic chemistry and catalysis in ionic liquids	SR 014
15.00-15.30		*Coffee Break*	
15.30-17.00	Klemens Massonne	Ionic Liquids at BASF SE: Introduction and technical applications	SR 014
19.00-….		*SR 14 – BBQ, Drinks, etc…*	

October 13th 2011			**Chemistry building**
8.30-10.00	Annegret Stark	Preparation, Purification and Analytics of ILs, and Examples of Impurity Effects in Applications	SR 014
10.00-11.30		*Coffee Break*	
11.30-12.30	Frank Endres	Ionic Liquids at solid interfaces: From 2-dimensional structures to synthesis of 3-dimensional materials – Part 1	SR 014
12.30-13.30		*Lunch*	
13.30-14.00	Frank Endres	Ionic Liquids at solid interfaces: From 2-dimensional structures to synthesis of 3-dimensional materials- Part 2	SR 014
14.00-14.45	Veronica Strehmel	Ionic Liquids in Polymer Synthesis	SR 014
14.45-15.30	Friedrich Kremer	Glassy dynamics and charge transport in Ionic Liquids	SR 014
15.30	Barbara Kirchner	Closing Remarks	SR 014