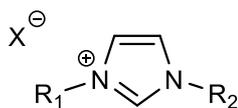


Ionic Liquids – from Green Solvents to Engineering Fluids; 10 Years of Research at ChemTech

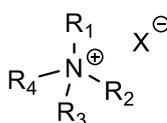
Dr. Roger Marti

HES-SO Haute école spécialisée de Suisse occidentale, Haute école d'ingénierie et d'architecture
Fribourg, Institute ChemTech, Péroles 80, CH-1700 Fribourg, Switzerland
roger.marti@hefr.ch

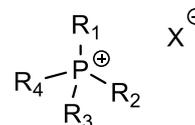
Ionic Liquids (IL) are organic salts with melting temperature typically below 100 °C. The ionic liquids are composed of bulky, asymmetric cations and ions. A big advantage of ILs is the endless number of cation/anion combinations, which allows to synthesize task-specific ionic liquids for specific applications (Dyson used the term "iLiquid" to describe the vast potential of ionic liquids [1]). The unique properties of ionic liquids such as their excellent chemical and thermal stabilities, their low vapor pressure, their important ionic conductivity, their flame resistance, and their ability to dissolve many "insoluble" compounds (for example cellulose or lignin) makes them interesting compounds in material science. Today ionic liquids are no longer recognized as "specialty chemicals" but are nowadays produced as bulk chemicals on ton scale. This makes them attractive for commercial applications and so in recent years IL found more and more use as engineering fluids in the industry [2].



Imidazolium-based ILs



Ammonium-base ILs



Phosphonium-based
ILs

Over the last years, the institute ChemTech has acquired a vast experience in the synthesis and scale-up of novel and innovative IL from lab scale to multi-kg scale. In addition to synthesis, we have brought ionic liquids to many applications such as solvent for oxidation reactions or as co-solvent for enzymatic transformations [3], for CO₂-capture and specially designed CO₂-based ionic liquids for further hydrogenation to methanol [4], as high-temperature lubricants for plastics, as liquid electrolyte for the construction of flexible thermoelectric generators (TEGs) [5], and as phase-change materials for energy storage.

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