Exceptional Materials via Ionic Liquids

From 2008-09-01 to 2013-08-31, closed project

Objective

Novel and improved nanomaterials with luminescent properties shall be synthesized in ionic liquids (ILs). In this approach the advantages of ionic liquids in nanoparticles synthesis (high nucleation rate, excellent electrosteric nanoparticles (NP) stabilization, morphology control, tunable properties) shall be combined with two unconventional synthesis methods that again take advantage of unique IL properties to obtain unprecedented compounds. Using a completely new and unconventional approach by evaporating metals, intermetallic phases or metal oxides and fluorides under high vacuum (negligible vapour pressure, low flammability of ILs!) into ionic liquids goes far beyond the state of art of nanoparticle synthesis and is expected to have a high technological impact and should offer a way to highly thermodynamically unstable reaction product. Secondly, microwave (MW) irradiation (high polarizability and conductivity of IL ions makes them excellent MW acceptors) of appropriate metal salt/IL solutions should not only lead to NP/IL systems but the reaction of two NP/IL solutions should again lead to otherwise non-accessible reaction products. In combination, new materials with improved properties will be gained. For example, ILs will improve the lifetime of luminescent rare earth (RE)-based systems due to the weaker covalent RE solvent interaction. Analysis and property determinations of the systems under investigation will involve a variety of aspects of chemistry, physics and materials science.

Related information

Report Summaries

Final Report Summary - EMIL (Exceptional Materials via Ionic Liquids)

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