

## Priority Programme

### “Material Synthesis near Room Temperature”



#### Project Description – Project Proposal

#### Intermetallic Nanoparticle Synthesis in Ionic Liquids

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#### Summary of proposal

The synthesis of intermetallic, i.e. bi- and trimetallic, nanoparticles (NPs) with transition metal TM/TM' or transition metal/main group metal combinations TM/E (E = Mg, Zn, Al, Ga, (In)) based on organometallic precursor chemistry will be investigated with special emphasis on the reaction control given by ionic liquids (ILs) as a non-conventional medium. The deposition of the NPs onto supports as well as NP and support surface functionalization will be done. Applications in hydrogenation catalysis will be investigated. The expected progress beyond the state of the art is seen in the specific opportunities offered by ILs for reaction control of precursor decomposition and cluster/nanoparticle growth without the need of additional stabilizers by low-temperature, fast and energy-saving microwave heating techniques. Thereby ILs should help to overcome limitations of existing chemical strategies using conventional solvents and techniques for bottom-up nanoalloy and nanoparticle synthesis. The chemical and physical properties of IL derived nanoalloys, e.g., in catalysis, are expected to be different from similar nanoalloys obtained by conventional wet-chemical methods in the presence of additional stabilizers.