

# Ionic liquids and deep eutectic solvents in the preparation of nanostructures

**Roksana Markiewicz, Stefan Jurga**

NanoBioMedical Centre, Adam Mickiewicz University, Umultowska 85, 60614 Poznan, Poland  
roksana.markiewicz@amu.edu.pl

## Abstract

Nanostructures due to their small size, in comparison with their bulk counterparts, possess unique properties including magnetic, electrochemical and photonic properties. Therefore, such nanomaterials found a wide variety of application in different fields such as catalysis, electronic and spintronics, life and material sciences. Controlling the morphology and structure of nanomaterials is of considerable interest, since it leads to materials with chosen physicochemical properties and functions. Various methods of preparation of thereof were described, and the use of ionic liquids and deep eutectic solvents is particularly interesting.

Ionic liquids (ILs) are salts composed of an organic cation and organic or inorganic anion, which have attracted much attention as media for the preparation of metal, metal oxides and organic nanostructures, due to their unique properties like negligible vapor pressure, wide liquid range, electrochemical and thermal stability and very good dissolving ability. The low surface tension of many ILs leads to high nucleation rates and small size of prepared structures, and as highly structured fluids, have a strong effect on the morphology of particles formed, therefore they are often called shape directing solvents [1]. With the great number of combinations of the anion-cation possible, it is possible to design an ionic liquid with task specificity. ILs form solvation layers around the nanomaterials thereby excluding the need for addition of any external stabilizing and capping agents [2]

To overcome the difficulties that ILs may bring (high price, toxicity, availability), a new generation of solvents called Deep Eutectic Solvents (DES), have been described. Formation of such DES can be obtained by simply mixing together two cheap and safe components capable of forming an eutectic mixture. DES may be used as a replacement of the traditional surfactants and growth promoter of various nanoparticles. They also play a role of stabilizer of metal and metal oxides nanoparticles.[3]

The aim of this work is to present the ionic liquids and deep eutectic solvents as a media for nanostructures preparation.

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## References

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