

Special Issue on
Hybrid Functional Nanomaterials in Ionic Liquids and Applications

CALL FOR PAPERS

Self-assembly is a process where a disordered system of one or more components spontaneously forms a reversible organized structure or pattern as a result of specific interactions among the components in the system. This phenomenon is widely observed in biological systems for development of complex and functional macromolecular superstructures such as nucleic acids and proteins. Taking inspiration from nature, a range of synthetic organic molecules and peptides have been used to synthesize functional nanomaterials that have advanced our understanding of template-directed assembly of organic-inorganic nanoscale objects under equilibrium conditions.

Most of the self-assembly studies have hitherto explored the aqueous media as fluid phase for self-assembly of amphiphilic biomacromolecules, wherein architectural modification of biomolecules is generally a prerequisite for self-assembly of modified biomolecules. Furthermore, ionic liquids (ILs) can act as nonaqueous designer solvents to self-assemble biomacromolecules without requiring their prior modification. ILs (commonly referred to as room-temperature molten salts or room-temperature ILs) have recently become attractive reaction media for the “green” synthesis of nanomaterials due to their unique physicochemical properties such as high viscosity, high ionic conductivity, high thermal and chemical stability, and negligible volatility.

This special issue focusing on self-assembly of biomolecules in various ILs can also provide an exciting expansion of our theoretical understanding of nanobiointerfacial molecular self-assembly by exploring such processes in nonaqueous media. Moreover, the utilization of self-assembled biomacromolecular soft nanomaterials as in situ self-catalyzing templates for the synthesis of functional hybrid nanomaterials in IL is interesting because these nanostructures retain the functionality of biomolecules for multiple newer applications.

The purpose of this special issue is to publish high-quality research papers as well as review articles on self-assembled biomacromolecules in ionic liquids that can be further utilized as templating nonreactors for synthesis of biomolecule containing hybrid nanomaterials for various applications in gene delivery (both transformation and transfection), gene silencing (using siRNA), drug encapsulation and controlled release, biocatalysis, biotransformations, biosensing, bioelectronics, bioenergy, and tissue engineering.

Potential topics include but are not limited to the following:

- ▶ Ionic liquid mediated synthesis of metal/metal oxide nanomaterials
- ▶ Inorganic-organic hybrid nanomaterials in ionic liquids
- ▶ Application of nanomaterials synthesised utilising ionic liquids in nanobiotechnology and nanomedicine
- ▶ Ionic liquid as media for biomolecular (protein/peptide/lipids/nucleic acids) self-assembly leading to soft nanomaterials
- ▶ Nanocellulose/biopolymers in ionic liquids and application in biofuels
- ▶ Fundamentals of nanomaterials’ synthesis in ionic liquid
- ▶ Role of ionic liquids in biosensing applications of nanomaterials
- ▶ Microfluidics based synthesis of nanomaterials utilising ionic liquids
- ▶ Electrochemical synthesis of nanomaterials in ionic liquids and applications

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