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Mini Review

Chemistry of Nanomaterial in Supramolecular System

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Abstract

Design, synthesis and manipulation of nano- materials derived from supramolecular system have found remarkable interest in recent times because of its wide applications in Pharmaceuticals sciences, sensor and biology. The advanced size and shape-dependent properties of nano-materials have significantly impacted all spheres of human life and environment making nanotechnology a promising field for biomedical and chemical applications.

Keywords: Supramolecular chemistry; Nanomaterial; Calix system; Applications

Introduction

Supramolecular chemistry is a comparatively advanced field of nanoscience which focuses moderately literally ongoing "chemistry beyond molecule". It can be described as the study of systems which contain more than two molecules, and it purposes to understand the structure, modification, function, and properties of this system. Supramolecular chemistry arose when nanoscience had become a relatively mature subject and the synthesis and properties of supramolecular compounds had become well understood [1]. Now a day, the synthesis of nanomaterial have attracted increasing interest because of their unique properties and promising applications [2,3]. The synthetic technique for fabricating nanoparticles and nanomaterial involved the reduction of highly positive charged metal salts in presence of stabilizing or capping agent, which prevents them from combination and allows isolation of nanoparticles [4,5]. Among all, organic molecules have gained much attention because of their prospective and advanced application in both stabilizing as well as capping agent [6-9]. Surfactants [10] were highly effective at stabilizing metal nanoparticles of different sizes, creating opportunities to fabricate well-defined nanostructures with size-tunable materials properties [11-13]. The study of the dispersion and stability of heteroatoms containing encapsulated gold, silver and palladium nanoparticles through extracting metal particles from hydrosol into toluene or chloroform using organic derivative surfactant as an extracting have also been done and it was revealed that the many systems (calix, hetero ring, polymers etc.) surfactants [14] with sulphur functionalized head groups could make the mid nanometer sized gold particles dispersed in organic solvents (Figure 1).

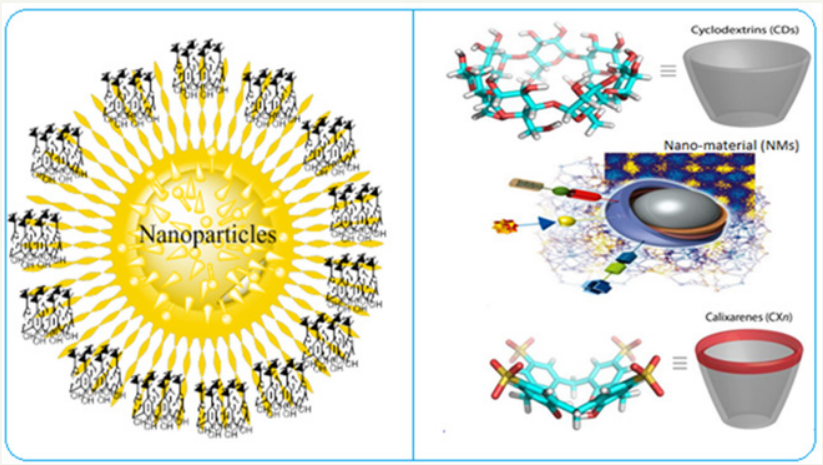

Figure 1

Supramolecules have received much attention in the recent past for their use as reducing as well as stabilising agent for the preparation of metal nanoparticles [7,15]. Metal nanoparticles are the most widely examined nano-materials due to their unique optical properties, which can be applied in various applications such as bio-sensing, detecting of elements and imaging techniques. Supramolecules reduced nanoparticles find application in the fields of catalysis [4], pharmaceutical science [16], environmental science [17], inorganic drug chemistry, Biomolecular chemistry, biomedicine and physical chemistry [4,18] etc.

Conclusion

Here we showed various applications of nanomaterials of interest in supramolecular chemistry, mainly calix system, nanoparticles. Supramolecular chemistry deceptions behind any of these processes and it is essential to any successful approach leading to new and promising nanomaterials synthesized from supramolecules.

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