Poster

IN SITU POLYMERIZATION AND COMPOSITE FORMATION: AN EFFICIENT SYNTHESIS TECHNIQUE FOR NEW GENERATION *NANO*MATERIALS

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Nanotechnology is a rapidly growing area of material science because of their numerous applications in various fields such as catalysis, sensor, electronics and optics as well as in the application of medical science. The unique properties of metal nanoparticles are directly related to their size and are significantly different from those of the corresponding bulk materials. Besides precise control over the size and shape, the stability of nanoparticles is an extremely important issue. Surfactants, polymer and thiol functionalized molecules have also been used in the synthesis of particles to promote stabilization. The advantage of polymer as a stabilizer is due to its robust nature which could give the metal particles additional stability.

'*In situ* polymerization and composite formation' (IPCF) types of reactions, specifically for the synthesis of 'metal-polymer composite material' [1-4], have potential advantage in the area of 'synthetic material science' because both the polymer and the nanoparticles are produced simultaneously which facilitate an intimate contact between the particles and the polymer through functionalization. The resultant material, which shows interesting catalytic, electrical and magnetic property, would acquire the quality of both components, such as, good stability, conductivity, optical property and catalytic activity from the metal and easy processing, light weight and also tunable conductivity from the polymer. We synthesized a series of composite materials exploiting the IPCF approach and used them for catalytic application that showed tremendous potential of these kinds of materials. We report on our results of conductivity and magnetic investigations on nano-structured composites, which highlight the potential of this type of material for versatile applications.

We believe that an ideal composite material having a higher degree of nano-level interaction between two components might be expected to exhibit an improved performance with wider applications in various systems of basic science and engineering.

References:

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