

A novel organogel template for synthesis of one pot silver nanoparticles and its potential application in catalysis

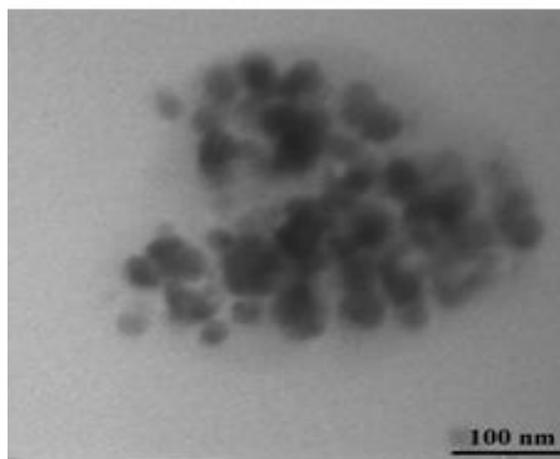
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Organogels, in which organic solvents are gelled by low molecular weight organic compound, commonly known as organogelators have attracted much interest as a result of their applications, Such as agents for oil spill problems, as templates for making helical transition metal oxides and silica, smart materials sensitive towards various external stimuli such as pH, light, sound, temperature, (1) and so forth. Organogels have also been used as a template for the preparation and protection of metal nanoparticles (2) .Metal nanoparticles have been extensively investigated due to their unique physical and chemical properties and wide range of potential applications. Silver nanoparticles, in particular, can be used as catalyst, refrigeration dilution agent, immunity sensors and antimicrobial materials .At present; there are lots of techniques available for the synthesis of metal nanoparticles. However, the key issues with these techniques are the control of particle size and prevention of agglomeration, which is very important in application.

We have reported the synthesis of a novel class of Thiazole based organogelators (3). Low-molecular-mass organogelators are an important class of soft matter, consisting of multiple entangled fibrillar networks which can be used to direct the shape and size of the inorganic materials, and imprison a large quantity of liquid. Hence, application of this organogel as a template for one pot synthesis of silver nano-particle was demonstrated. Organogel was used as Template for the synthesis of silver nano-particles by simple UV treatment method of silver salt. The synthesized nanoparticles were characterized by various methods such as powder X-ray diffraction studies and Transmission electron microscopy (TEM).



TEM image of Silver nanoparticles formed within the gel fiber

Furthermore, we demonstrate the efficient use of silver nanoparticles loaded organogelator in the reduction of nitro group. The organogel utilization as a reactor was demonstrated by employing one pot synthesized Ag nanoparticles in the reduction of 4-nitrophenol by using an aqueous sodium borohydride solution. A very good catalytic activity has been observed. It also showed promising reusability.

References:

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