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TITLE

Metal nanoparticles and semiconductor nanocrystals synthesis and applications

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Synthesis of metal and semiconducting nanomaterials are of paramount of interest due to their tunable optical, electrical, catalytic and magnetic properties. Thus, they are considered as promising building blocks for construction of functional nano devices, biomedical imaging, drug delivery, and industrial catalytic processes. For last several years we explored synthesis metal nanoparticles such as Au, Ag, Cu, Pt or Co or their alloys studied their physical & chemical properties and applied explored them for real world application likewise in catalysis or photo catalysis and surface enhanced Raman spectroscopy and advanced photovoltaic research. As an example, the colloidal synthesis of Au and Ag nanoparticles were also accomplished both in organic and aqueous media followed by simple reduction of gold or silver salt with reducing agents.

On the nanocrystals front we have synthesized numerous nanocrystals staring from CdS, CdSe@ZnS, which are known to be very brightly fluoresce. Now our focus is devoted very much on synthesis of cadmium free and environmental friendly colloidal nanocrystals for photovoltaic and biomedical applications. The synthesis of nanocrystals encompassing, InP/ZnS, $CuInS_2$/ZnS or $CuInSe_2$ with tunable colors or optical properties. As a representative example, we were able to synthesize, highly luminescent and size tunable InP/ZnS nanocrystals in a non-coordinating solvent under inert conditions. We were also very successful in synthesis of $CuInS_2$ or $CuInSe_2$ (CIS) based nanocrystals with tunable optoelectronic properties. The InP or CIS nanocrystals optical absorption and fluorescent properties have been thoroughly investigated. As a matter of fact, the synthesis of stable InP is very challenging due to nanocrystals instability. The nanocrystals have been coupled with nanostructured oxides and developed photovoltaic devices. Herein, we present some of our recent research & development activities on the nanocrystals & nanoparticles synthesis with tailor made properties will be presented and discussed.

Biography

Dr. Vanga Reddy graduated with Ph. D from University of Berne, Switzerland in the area of Nanotechnology. Afterwards, he moved to USA and continued his research in Nanotechnology in various capacities at different organization both in science and engineering departments. He has published several journal articles and conference proceedings and presented his research in the area of photovoltaics, solar energy conversion as well as colloidal chemistry and nanomaterials based formulations for nano-electronics and biomedical sensors. He has won many laurels, awards and recognition for his creative research on nanoscale followed by bottom up approach. Dr. Reddy is also acting as a reviewer for numerous scientific journals in his area of expertise as well as severing on journal editorial boards or review panels.