TALK

Speaker: Dr. Manju Lata Rao

Title: Non - Conventional Approaches to Nanomaterials Synthesis

Date: 7th April 2017

Time: 5:00 PM

Place: Samtel Centre Seminar Room

Abstract: The talk highlights a Sonochemical approach to nanomaterials synthesis with special emphasis on novel structure-property correlation. Sonochemistry is a process in which ultrasound is used to achieve high-energy chemistry. When an acoustic field is applied to a liquid, bubbles within the liquid undergo a process known as acoustic cavitation. The growth and collapse of these microbubbles focuses and transfers energy from the macro-scale (acoustic wave) to the micro-scale (vapor inside the bubbles) producing extremely high, localized pressures and temperatures with exceptionally high cooling rates $>10^{10}Ks^{-1}$. This unique focusing process generates highly reactive free radicals that have been observed to significantly enhance chemical processing while the rapid quenching results in the formation of amorphous nanomaterials. We have exploited the use of high frequency ultrasound waves to synthesize a series of Co-based and Fe-based nano alloys and nano chalcogenides and observed novel structure - property correlations in nano dimensions.

Nanometal, alloys, oxides and chalcogenides, synthesized using other non-conventional approaches like *microwave combustion, microwave – wet chemical and bio-inspired materials synthesis* using metalo-organic precursors showing unique structure-property correlations will be discussed. A materials scientists perspective to the 'Structure of water' based on Raman Spectroscopy and its relevance in various biomedical applications will be briefly discussed.