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Biotemplated semiconductor/ Metal nanostructures - Their characteristic features and future prospects

Anil Kumar

Indian Institute of Technology Roorkee, India

Abstract

Biological systems in nature demonstrate a unique ability to integrate small molecules into large scale functional hierarchical structure(s) involving spontaneous folding and subsequent self assembly of the nanosized building blocks through supramolecular directed bonding [1]. The present talk will focus on synthesis and properties of some supramolecular directed nanostructures consisting of semiconductor(s) and/or noble metals mediated by RNA and its components as matrix in aqueous medium. The chemical functionalities of nitrogenous bases and backbone allow non-covalent supramolecular interactions *viz.* hydrogen bonding, van der Waals, and electrostatic with inorganics to cause their stabilization. The presence of excess metal ions on the matrix also induces polarization in semiconductors to bring a change in their interaction(s) with the matrix and morphology. It thus produces quantized building block(s), which in the process of self assembly yields nanostructures of varied dimensionality and morphology. Supramolecular interactions passivate the surface of nanostructures to influence their optical, electronic and magnetic properties. The presence of colloidal metal(s) in biotemplated binary / ternary nanosystems further influences these properties in complex process. A correlation between their morphology, dimensionality and properties will be analyzed and their future prospects will be discussed.

Biography

Dr. Anil Kumar has completed his doctorate in Chemistry from University of Roorkee in 1977. He carried out postdoctoral research at Radiation Lab., USA during 1979-1982 and worked as a Guest Scientist at Hahn-Meitner-Institut, Berlin during 1986-88. He is working as Professor in Chemistry at IIT Roorkee since June 2001 and acted as Head, Centre of Nanotechnology during 2006-2011. He has received Khosla Research Award(s) and Medal(s) during 1993-94 and 2002-03, respectively. He was elected as a Fellow of a prestigious National Academy of Sciences, Allahabad in 2003. He has supervised 13 Ph.Ds and published 71 papers in peer-reviewed journals.