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Sheshanath V. Bhosale

Goa University, India

Supramolecular Chemistry: New Dimensions of Chemistry on the Nanoscale

Machinery of life was developed biologically in long-term evolutionary processes, and there is no protocol about the experiments, which finally succeeded. Chemists have been successful with synthesis, isolation and analysis but not with the reproduction of the working molecular apparatus. The introduction of supramolecular self-assembly approach as an engineered phenomenon allowed us to address one of the great challenges on nanoscale level – the separation, containment and manipulation of individual molecules and allow studying molecular interactions, which would make it possible to answer some simple biological questions experimentally on nanoscale level, which are difficult to approach in complex biological modules.

As a part a more diverse research program within our group in supramolecular chemistry, my team have been exploring new approaches to combating several unanswered questions in sciences. For example:

- 1) Can small molecules are sensitive and selective enough for sensing applications?
- 2) Are small molecules a valid approach for development of luminescent material?
- 3) Can the Photosynthetic Reaction Centre (PRC) effectively mimicked by synthetic systems for energy transduction?
- 4) Are small molecules a valid approach for molecular electronics?

In this presentation, I will highlight the work of my team based on small organic molecules and present their achievements in relevant fields. This talk will focus on discussion of innovative and cutting-edge research program on smart functional material on the nanoscale level and their applications such as molecular recognition, environmental, energy, and drug delivery.

Biography

Sheshanath Bhosae has completed his PhD at the age of 29 years from Freie University, Berlin, Germany and postdoctoral studies from University of Geneva, Switzerland. This was followed by a stay at Monash University, Australia, for five years as an ARC-APD Fellow. He worked at RMIT University, Melbourne as an ARC-Future Fellow. He has published more than 240 papers in reputed journals and has been serving as an editorial board member of reputed journal ChemistryOpen, Aggregates, Molecules, Sensors etc. His work has received >6500 citations with h-index 37 and i-index 147. He has supervised 10 PhD students. His research interest is in the synthesis of pi-functional materials for sensing, biomaterials and supramolecular chemistry applications.