

Protein protected noble metal quantum clusters for biomedical application

Meegle S. Mathew¹, Kuruville Joseph² and Joyal Davis³

^{1,2}Department of Chemistry, Indian Institute of Space Science and Technology, India

³Indian Institute of Science Education and Research, India

Fluorescent Noble metal quantum clusters have received great attention and have been intensively studied due to their unique photophysical and chemical properties. Properties of quantum clusters are distinctly different from bulk and metallic nanoparticle, composed of several tens of atoms. They have sub-nanometre core size with discreet energy levels and show molecule like optical properties. Their easy one step and green synthesis make them particularly attractive. Noble metal quantum cluster gold quantum cluster was synthesised using various templates like peptides, amino acids, dendrimers, DNA and proteins. Among this, protein direct synthesis of the cluster has received much attention due to its easy preparation and potential biomedical application.

We have prepared protein directed synthesis of gold, silver, copper and gold- silver alloy quantum clusters. The formed highly stable quantum clusters showed intense fluorescence emission and were characterised using UV-Vis spectroscopy, fluorescence, FTIR spectroscopy, transmission electron microscopy (TEM) and X-ray photoelectron spectroscopy (XPS). These quantum clusters further used for biomedical application including biosensing, such as sensing of a neurotransmitter, acetylcholine, blood-creatinine sensing and development of biomedical devices such as intrauterine devices.

Biography:

Meegle S Mathew took post-graduation in Chemistry in the year 2012 in first class. She qualified in National Eligibility Test (NET) and GATE in the year 2013. She have been working as a PhD Student since 2013 under the guidance of Professor Kuruville Joseph at Department of Chemistry, Indian Institute of Space Science and Technology, Thiruvananthapuram in the area of "Synthesis, Studies and Applications of noble metal quantum clusters". She have two publications in international journals, one in Biosensors and Bioelectronics and the other in RSC Advances. She presented papers in two international conference and two national conferences. Her research area includes synthesis of noble metal quantum clusters and its biomedical application such as bio sensing, bio imaging etc.