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VB6 conjugated fluorescent nanoclusters as sensory probes for metal ions and its biological applications

Shilpa Bothra and Suban K Sahoo

S V National Institution of Technology, India

The development and applications of chemosensors/nanosensors based on the optical methods (mainly colorimetric and fluorescence) for the detection of trace amount of cations and anions in various biological and environmental systems are increasingly captivating the attention of many scientists due to the several advantages such as high selectivity, sensitivity, naked-eye detectable, low detection limit, cost-effective, and on-site real monitoring without any need of sophisticated instrumentations. The fluorescent noble metal nanoclusters especially of Au, Ag and Cu have been successfully exploited in the fluorescent sensing of metal ions, anions, nitro-compounds, amino acids and so on, because of their synthetic simplicity and surface modification, ultrafine size, size-dependent emission, low toxicity, anti-photo bleaching, higher PL quantum yield, large stokes shift, superior catalytic activity, high solubility, biocompatibility and high stability in ambient conditions. Template based approach using different scaffolds like DNA, peptides and

proteins, dendrimers and polymers has been utilised to synthesise various fluorescent metal NCs. Continuing our research on vitamin B6 cofactors like pyridoxal (PL) and pyridoxal 5'-phosphate (PLP), our present research focusses on conjugation of these cofactors with highly fluorescent nanoclusters of gold/silver stabilized using bovine serum albumin (BSA), lysozyme (Lyso) and polyethylenimine (PEI), and were applied for the sensing of various analytes.¹⁻³ The sensing of Hg²⁺ ions with this fluorescent nanoclusters were also tested by preparing the chemically-modified cellulosic paper strips.¹ The fluorescent Lyso-AuNCs was conjugated with PLP and applied for the turn-on sensing Zn²⁺ in various environmental and biological samples.² The fluorescent PEI-AgNCs was conjugated with PLP and applied for the detection of Zn²⁺ and Cd²⁺.³ With our reported and current work on the small molecules conjugated fluorescent nanoclusters, we are observing their potential applications in the field of sensing and biosensing.

Biography

Shilpa Bothra is a Research Associate in the Department of Applied Chemistry at SV National Institute of Technology, Surat, India. Her research interest includes VB6 conjugated fluorescent nanoclusters as sensory probes for metal ions and its biological applications.

bothrashilpa7@gmail.com

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