

SELECTIVE DETECTION OF HEAVY METAL IONS BY USING A NOVEL NANO MATERIAL ATTACHED ARYL-AZO-HISTADINE PROBE

Salma Begum, Avijit Pramanik and Paresh C. Ray

Department of Chemistry and Biochemistry, Jackson State University, Jackson, MS 39217, USA

Abstract: Heavy metal pollution is one of the most serious environmental problems, which undermines global sustainability. Many efforts have been made to develop portable sensors for monitoring heavy metals in the environment. Incorporation of nano material and nanostructures into sensors leads to significant improvement in the performance of devices in terms of sensitivity, selectivity, multiplexed detection capability and portability. In addition, small molecules, DNA, proteins and bacteria have been integrated with inorganic materials to selectively bind heavy metals as the molecular recognition probes. We develop a sensor using 4-Aminophenyl disulfide- L-Histadine dye coupled with Gold nano particles, which allows selective detection of heavy metal ions in water and its sensing properties were evaluated and monitored by analytical tools such as UV-vis, IR, TEM and surface enhanced Raman spectroscopy. Metal nanoparticles exhibit unique optical properties due to excitation of localized surface Plasmon, which makes them highly sensitive probes for detecting small, local changes in their surrounding environment.

Key words: Heavy metal detection and selectivity, Histadine based aryl-azo nano probe, Surface enhanced Raman spectroscopy

Acknowledgements: We would like to thank National Science Foundation (PREM NSF DMR- 1205194) and NIH/NCRR (Award Number: G12RR013459) & NIH/NIMHD (Award Number: G12MD007581) for supporting the Analytical Core Laboratory Facilities