GOLD NANOPARTICLE BASE SIMPLE COLORIMETRIC AND ULTRASENSITIVE DYNAMIC LIGHT SCATTERING ASSAY FOR SELECTIVE DETECTION OF PB(II) FROM ENVIRONMENTAL SAMPLE

Lule Beqa, Anant Singh and Paresh Chandra Ray

Department of Chemistry, Jackson State University, Jackson, MS, USA

Abstract: Pb (II) is a common environmental pollutant with high toxicity. According to the CDC about 310,000 U.S. children ages 1 to 5 have high levels of lead in their blood. Since lead is nondegradable, accumulation of high level lead in children can cause irreversible brain damage, retard mental and physical development. As a result, the development of ultrasensitive assays for the real-time detection of Pb(II) from toy and paint is very important for environmental controlling, clinical toxicology, and industrial process. Driven by the need to detect trace amounts of Pb(II) from environmental samples, we will discuss our recent report on, a label free, highly selective and ultra-sensitive glutathione modified gold nanoparticle based dynamic light scattering (DLS) probe for Pb(II) recognition in 100 ppt level from aqueous solution, with excellent discrimination against other heavy metals. The sensitivity of our assay to detect Pb(II) level in water is about 2 orders of magnitude higher than the EPA standard limit. We have also demonstrated that our DLS assay is capable of predicting amount of Pb(II) in paint, toys and water from MS River. A detailed mechanism for significant DLS intensity change will be discussed. Our experimental results will be discussed open up a new possibility of rapid, easy and reliable diagnosis of Pb(II) from environmental sample by measuring the DLS intensity.