Highly Sensitive and Selective Plasmonic Detection of Heavy Metal Ions in an Aqueous Solution

송현돈, 최인희[1], 양영인, 홍수린, 이수승, 강태욱[2], 이종협*
서울대학교; [1]Cornell University; [2]서강대학교
(jyi@snu.ac.kr*)

Heavy metal ions are well known to be harmful to human health and the environment. Due to their toxicity, many studies have been developed methods for sensitive and selective detection of the heavy metal ions. In this study, plasmonic shift of thiolated molecules-functionalized single gold nanoparticle has been utilized in the highly sensitive and selective detection of mercuric ion by using a dark-field microspectroscopy. The method is based on the selective complexation of mercuric ions with the thiol functionality and change in the localized surface plasmon resonance-induced scattering property of the single nanoparticle. The detection method permits picomolar detection of mercuric ions and highly selective detection over environmentally relevant metal ions. Based on the findings reported herein, the method provides potentials for environmental monitoring and biosensing.