

Characterization of the optical properties of heavy metal ions using surface plasmon resonance technique.

ABSTRACT

The aim of this research is to characterize the optical properties of heavy metal ions (Hg^{2+} , Cu^{2+} , Pb^{2+} and Zn^{2+}) using surface plasmon resonance (SPR) technique. Glass cover slips, used as substrates were coated with a 50 nm gold film using sputter coater. The measurement was carried out at room temperature using Kretschmann SPR technique. When the air medium outside the gold film is changed to heavy metal ions solution, the resonance angle shifted to the higher value for all samples of heavy metal ions solution. By our developed fitting program (using Matlab software), the experimental SPR curves were fitted to obtain the refractive index of Hg^{2+} , Cu^{2+} , Pb^{2+} and Zn^{2+} ions solution with different concentrations. Both the real and imaginary part of refractive index of the heavy metal ions solution increased with the concentration. The results give the basic idea such that the SPR technique could be used as an alternative optical sensor for detecting heavy metal ions in solution.

Keyword: Surface plasmon resonance; Optical properties; Heavy metal ions.