

## Analysis of Pb(II) ion sensing by crosslinked chitosan thin film using surface plasmon resonance spectroscopy

### Abstract

The crosslinked chitosan thin film had been studied as a sensor element of surface plasmon resonance (SPR) optical sensor. Crosslinked chitosan solution was synthesized by homogeneous reaction of medium molecular weight chitosan in aqueous acetic acid solution with glutaraldehyde as crosslinking agent. It was deposited on gold film by spin coating. Using SPR technique, the optical properties of crosslinked chitosan thin film before and after contacting with different concentration of Pb(II) ion in a range of 0.5–100 ppm had been obtained by fitting. The resonance angle shifted to lower value as the Pb(II) ion concentration increased. Changes in the resonance angle ( $\Delta\theta$ ) are directly proportional to the concentration of Pb(II) ion solution. X-ray photoelectron spectroscopy (XPS) had been employed to confirm chemical elements and their bonding of the thin film prior to adsorption, as well as chemical interactions involved between Pb(II) ion and the thin film.

**Keyword:** Crosslinked chitosan; Pb(II) ion; Surface plasmon resonance (SPR); X-ray photoelectron spectroscopy (XPS).