Di-iron trioxide hydrate-multi-walled carbon nanotube nanocomposite for arsenite detection using surface plasmon resonance technique

ABSTRACT

We present surface plasmon resonance-based sensor for arsenite [As(III)] detection using Di-iron trioxide hydrate - multi-walled carbon nanotube ($Fe_2H_2O_4$-MWCNT) nanocomposite as a sensing layer. The enticing traits of $Fe_2H_2O_4$-MWCNT having high surface to volume ratio and good affinity toward arsenic have proven to enhance As(III) absorption onto the sensing surface and consequently increase the sensitivity of the sensor. When tested with different concentrations of As(III) within the range of 0.2 ppb to 1 ppb, sensitivity value was obtained at $1.756°$ ppb -1 with $Fe_2H_2O_4$-MWCNT thickness of 7 nm. The detection limit was achieved at 0.2 ppb which surpassed conventional methods and reported studies on SPR-based sensor for As detection.