

### Visible light-induced photocatalytic silver enhancement for gravimetric immunosensors

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A novel microgravimetric immunosensor has been developed using CdSe nanoparticle-based immunoassay and silver enhancement reaction under visible light. We have previously demonstrated the enhancement using UV light<sup>1</sup>. However, UV light can cause damages on proteins, complication with selections of sensor surfaces and unfavorable reproducibility. Visible light, however, efficiently solves these problems. An antibody conjugated CdSe nanoparticle is reacted with its cardiac troponin I (cTnI) antigen and bound to the antibody immobilized on a quartz resonator. When the nanoparticles are exposed to visible light in silver nitrate solution, the nanoparticles photocatalytically reduce silver ions resulting in the formation of silver metals onto the nanoparticles. This induces a decrease in the resonance frequency. The frequency change by this photocatalytic reduction reaction is nearly two orders of magnitude larger than the change by antigen binding alone. This enhancement can be further optimized by increasing the concentration of AgNO<sub>3</sub> solution and the light exposing time.

1. Seo H, Joo J, Ko W, Jung N and Jeon S 2010 Nanotechnology 21 505502