

## Enhanced Photocatalytic Hydrogen production through the Complexation of Silver/TiO<sub>2</sub> with Thiocyanate

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POSTECH  
(wchoi@postech.ac.kr\*)

Silver nanoparticles (NPs) have been used to improve the efficiency of solar cell and semiconductor-metal nanocomposites due to its unique properties of plasmonic effect and electron storage. Silver can be considered as an alternative co-catalyst of platinum which is popular but expensive. On the other hand, it still exhibits lower efficiency than Pt for photocatalytic water splitting. Herein, the photocatalytic hydrogen production was significantly enhanced by more than 400% via the complexation of thiocyanate (SCN<sup>-</sup>) with silver nanoparticles loaded on TiO<sub>2</sub>. We characterized the complexation of SCN<sup>-</sup> with silver nanoparticles by using various techniques including Raman spectroscopy, energy-dispersive spectroscopy (EDS), and X-ray photoelectron spectroscopy (XPS). The effect of Ag and thiocyanate complex layer on the charge separation efficiency was investigated through Electrochemical Impedance Spectroscopy (EIS) and photocurrent measurement. This study proposes a strategy to improve hydrogen production efficiency via the surface complexation of silver with thiocyanate.