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## Optical properties of DC sputtered titanium dioxide/gold thin films

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Titanium dioxide ( $\text{TiO}_2$ ) thin films have been generally accepted as an important material in the fields of photocatalysis, photovoltaic and photochromic. The efficiency of  $\text{TiO}_2$  films as an active layer in various applications strongly depends on their optical properties. In this present study, the optical properties of sputtered  $\text{TiO}_2$  thin films were modified using nanoparticles gold (Au) underlayer.  $\text{TiO}_2$  thin films with 100 nm thickness were prepared by DC magnetron sputtering on gold-coated glass substrate with the estimated thickness approximately 2, 6 and 10 nm. The deposited  $\text{TiO}_2/\text{Au}$  films were characterized using UV-Vis spectroscopy and photoluminescence (PL) spectroscopy. The transmittance of  $\text{TiO}_2/\text{Au}$  film in the visible region decreased from 87% to 50% when thickness of gold underlayer increased from 0 to about 10 nm. In addition, energy gap of  $\text{TiO}_2/\text{Au}$  film from Tauc's plot decreased with the increase of the thickness of gold underlayer while the wavelengths of peak emission spectra obtained from PL were found to be increased. The modified optical properties indicated the probability of light absorption which led to the increase in electron-hole pair generation in this composite film.

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