

## New photocatalysts for hydrogen production by water splitting

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### ABSTRACT

Different titania-gold based catalysts have been synthesized by an easy chemical reduction method, using sodium borohydride ( $\text{NaBH}_4$ ) as reducing agent. The characterization results showed that the gold nanoparticles were deposited homogeneously on the support surface of  $\text{TiO}_2$  nanowires ( $\text{TiO}_2\text{NWs}$ ), increasing the surface area of the synthesized catalysts. The photocatalytic activity of these materials was characterized by measuring the hydrogen production by water splitting, using UV-vis radiation. All  $\text{Au@TiO}_2\text{NWs}$  catalysts, with different percentage of surface gold nanoparticles, were active in the hydrogen production reaction, being  $1,436 \mu\text{molh}^{-1}\text{g}^{-1}$  the highest hydrogen production, obtained by irradiation at 400 nm. The different activity of the catalysts was found to be dependent on the surface area of the composites, and on the presence of a plasmon resonance exhibited by the gold nanoparticles under visible light.

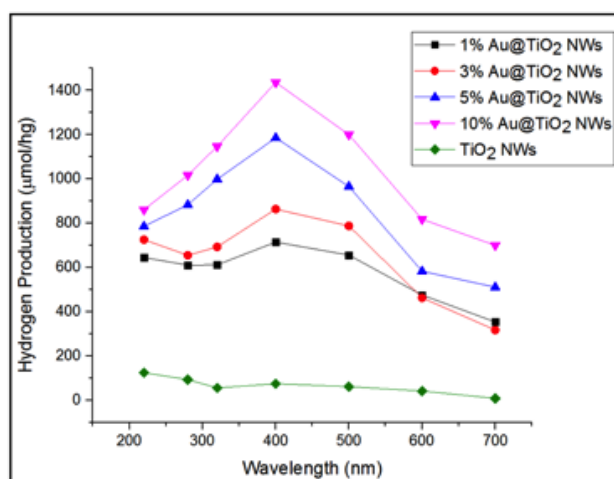


Fig. 1 Hydrogen production for the different  $\text{Au@TiO}_2\text{NWs}$  catalysts.

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