

## Photocatalytic Hydrogen Production from Butanol over Ag/TiO<sub>2</sub>

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**Abstract :** Global warming is one of the most important environmental issues which arise from occurrence of gases such as carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>) in the atmosphere. Exposure to these greenhouse gases results in health risk. Hydrogen is regarded as an alternative energy source which is a clean energy carrier for the future. There are different methods to produce hydrogen such as steam reforming, coal gasification etc., however the challenge with these processes is that they emit CO and CO<sub>2</sub> gases and are costly. Photocatalytic reforming is a substitute process which is fascinating due to the combination of solar energy and renewable sources and the use of semiconductor materials such as catalysts. TiO<sub>2</sub> is regarded as the most promising catalysts. TiO<sub>2</sub> nanoparticles prepared by hydrothermal method and Ag/TiO<sub>2</sub> are being investigated for photocatalytic production of hydrogen from butanol. The samples were characterized by raman spectroscopy, TEM/SEM, XRD, XPS, EDAX, DRS and BET surface area. 2 wt% Ag-doped TiO<sub>2</sub> nanoparticle showed enhanced hydrogen production compared to a non-doped TiO<sub>2</sub>. The results of characterization and photoactivity shows that TiO<sub>2</sub> nanoparticles play a very important role in producing high hydrogen by utilizing solar irradiation.

**Keywords :** butanol, hydrogen production, silver particles, TiO<sub>2</sub> nanoparticles

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