

ABSTRACT

SYNTHESIS AND CHARACTERISATION OF METAL-TiO₂ PHOTOCATALYST FOR VISIBLE LIGHT PHOTOCATALYTIC WATER SPLITTING

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Titania based photocatalytic water splitting technology has a great potential for low cost and environmentally friendly solar hydrogen production to support the future hydrogen economy. TiO₂ was preferred to other photo-sensitive semiconductors as it is stable, non corrosive, environmental friendly, abundant and cost effective. However the band gap of TiO₂ is 3.2 eV. Hence it is active only under ultraviolet (UV) portion of the total solar spectrum. The total solar radiation contains only 4% of UV part while the visible part contributes about 50%. Hence there is a need to shift the photo response of TiO₂ into visible region in order to effectively utilise visible solar radiation. Transitional metal ion doping and noble metal loading can be applied to shift the photoactivity of TiO₂ under visible solar radiation. This project aims to synthesize and characterize copper, nickel and iron doped and silver loaded TiO₂ samples and test their activity in visible light for photocatalytic water splitting. Sol-gel method was employed to synthesize the metal doped and metal loaded TiO₂ nanoparticles.

Key words: photocatalyst, band gap, sol-gel