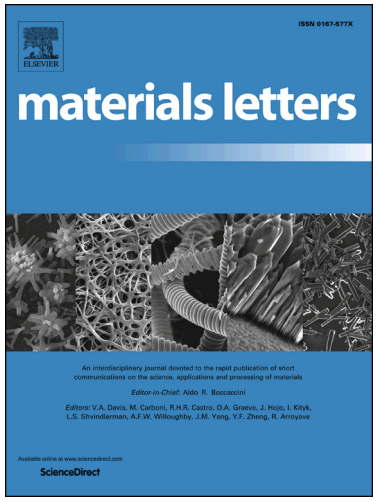

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Enhancement of Hydrogen Production over Screen-Printed $TiO_2/BiVO_4$ Thin Film in the Photoelectrochemical Cells.

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Abstract

In this letter, a novel visible light-driven $TiO_2/BiVO_4$ heterostructure thin film has been successfully fabricated via an advanced screen printing method. The photocatalytic hydrogen production was investigated by varying amount of TiO_2 loading (0, 0.1, 0.8 and 1.2wt.%) on the surface of $BiVO_4$ from water splitting in a photoelectrochemical (PEC) cell and dye sensitized solar cell (DSSC) system. The crystallographic, morphological and chemical composition properties of the prepared $TiO_2/BiVO_4$ thin film was investigated by using different characterization techniques. The 0.8 wt% $TiO_2/BiVO_4$ was identified as the most efficient photocatalyst by producing maximum accumulative hydrogen of 692 μmol within 120 min. The maximum hydrogen production obtained is attributed to a compact particle network between $BiVO_4$ and TiO_2 particles which provide an intimate contact with the electron collecting FTO substrate.

Keyword: *$TiO_2/BiVO_4$, solar energy materials, photoelectrochemical cell, thin films, screen-printing.*

1. Introduction

In the past few decades, researchers have been comprehensively explored for a new form of renewable energy as a replacement for current fossil fuels [1]. Recently, photoelectrochemical