Surface modification of TiO_2 by adding V_2O_5 nanocatalytic system for hydrogen generation

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Abstract

The surface modification of titanium-di-oxide semiconductor was done by adding V_2O_5 for enhanced visible light activity for generation of hydrogen. Hence, the main goal of the present work is to achieve the visible light activity using the synthesized photocatalyst for hydrogen production through water splitting. Hydrogen exists in nature and benefits the ecosystem by reducing the carbon emissions in the environment. Therefore, it is a self-motivated choice of researchers to produce hydrogen in large scale to save the environment from severe pollution hazards. Meanwhile, photocatalytic activity proves to be the excellent source for hydrogen generation. In this connection, the nanocomposite TiO_2-V_2O_5 was synthesized by blending both sol-gel and thermal decomposition methods. The structural and morphological properties, surface area determination, absorption and band gap studies were carried out via various sophisticated instruments. The TiO_2-V_2O_5 composite system exhibits lower band gap that favored the photocatalytic activity in promoting hydrogen production.

Author keywords

Hydrogen production; Surface modification; Titanium-di-oxide; Vanadium pentoxide; Visible light