World Academy of Science, Engineering and Technology
International Journal of Bioengineering and Life Sciences
Vol:18, No:02, 2024

Synthesis and Characterization of Nano-Alumina Using Neem Oil as the Template for Efficient Hydrogen Generation via Photo-Hydrolysis of Sodium Borohydride

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Abstract : A friendly environmental source of energy as hydrogen was produced by photo-hydrolysis of hydrogen storage material as sodium borohydride (NaBH4), which is non-toxic and stores a high percentage of hydrogen. The photoreaction was produced under visible light and nano-alumina as a catalyst. In this study, we use more economical and friendly environmental oil as a template to produce a nano-catalyst. The prepared catalyst was characterized by X-Ray diffraction, N2-adsorption-desorption, Fourier Transforms Infrared, Scanning Electron microscope and X-Ray Photoelectron Spectroscopy. Different parameters such as catalyst weight, NaBH4 weight and time of irradiation were studied to obtain a highly efficient photo-hydrolysis reaction. The reaction is pseudo-first order and the hydrogen production rate was determined as 1500 ml min-1 g-1 at the optimum conditions.

Keywords : photo-reaction, nano-alumina, hydrogen production, sodium borohydride, visible light
Conference Title : ICAPSOP 2024 : International Conference on Artificial Photosynthetic Systems and Organic Photocatalysis
Conference Location : Jeddah, Saudi Arabia
Conference Dates : February 19-20, 2024