

## 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 ( $\text{NaBH}_4$ ), 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,  $\text{N}_2$ -adsorption-desorption, Fourier Transforms Infrared, Scanning Electron microscope and X-Ray Photoelectron Spectroscopy. Different parameters such as catalyst weight,  $\text{NaBH}_4$  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  $1500 \text{ ml min}^{-1} \text{ g}^{-1}$  at the optimum conditions.

**Keywords :** photo-reaction, nano-alumina, hydrogen production, sodium borohydride, visible light

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