

Glycerol steam reforming for hydrogen production : Effect of alkali metal over Ni/ γ -Al₂O₃

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Increase in biomass-derived fuel production has resulted in over-production of glycerol. Therefore there is considerable research interest in converting glycerol to hydrogen or value added chemicals. Steam reforming is one of the common processes to produce hydrogen from hydrocarbons and alcohols over nickel based catalyst. However one of the major drawback of Ni-based catalyst undergoes deactivation due to the carbon formation. In this work, the effect of alkali promoters(K, Ca, and Sr) on the hydrogen yield and carbon formation over spherical Ni-based supported catalysts was investigated in the production of hydrogen by steam reforming of glycerol. Catalysts were prepared by dry impregnation method, and characterized by various analytical techniques such as N₂ adsorption, TPR, XRD, TGA and TEM. It was found that the addition of alkali promoter increase the stability of the catalyst against the coke formation. Moreover, the presence of alkali metal on Ni/ γ -Al₂O₃ also inhibited sintering of active metal. Among the prepared catalysts, Sr-Ni/ γ -Al₂O₃ catalyst showed the best performance during steam reforming of glycerol.