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CONFERENCE PROCEEDING

Performance of nickel based catalysts using promoters for clean hydrogen production by steam glycerol reforming

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Abstract

Alternative and renewable fuel sources are becoming more and more promising due to the decrease in fossil fuel stocks. Biodiesel is one of the alternative fossil fuels which is produced by transesterification process in which glycerol is reates as by-product. The hydrogen fuel seems to be a promising way to a cleaner, better secure, and future for sustainable energy. This work focuses on producing clean, renewable hydrogen from the glycerol steam reforming by synthesis for nickel-based catalysts modified with different promoters like zirconium and lanthanum using wet-impregnation and co-precipitation processes. Preferred catalysts are those based on nickel because of its advantageous properties, which include high stability, effective bond cleavage, and affordability when compared to noble metals. Alumina support improves total catalytic performance by increasing surface area, offering excellent dispersion, great mechanical strength, and an anti-sintering action. The prepared catalysts physio- chemical properties were investigated by BET, SEM XRD, TPR techniques. Gas-solid atmospheric fixed-bed catalytic reactor was used to determine catalyst performance. Different operating conditions like ime of contact, temperature, steam to glycerol ratio were determined. Nickel catalyst doped with zirconium and lanthanum showed results with 96% conversion of glycerol and 86% yield of hydrogen and better resistance to carbon formation.

Keywords Biodiesel · Glycerol · Hydrogen · Nickel · Steam reforming · fixed bed catalytic reactor

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