

Hydrogen Production by Reforming Biodiesel Byproduct in Supercritical Water: Temperature Effect

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Biodiesel which is formed by transesterification reaction of vegetable oils with alcohols has received worldwide attention as a renewable transportation fuel. Biodiesel production processes generate byproduct glycerol which is about 10 wt% of biodiesel product. The byproduct contains significant amounts of unreacted feeds, water, biodiesel and catalyst as well as glycerol. Recently many studies have been carried out to investigate methods of utilizing the byproduct glycerol as a feedstock for energy production. In this work, hydrogen production from catalytic gasification of the byproduct glycerol in supercritical water was examined over the temperature range of 550–700 °C. Aqueous feed solution was prepared by dissolving byproduct glycerol in purified water to have a COD of about 150,000 mgO₂/L. The organic content of the feed solution was completely converted to hydrogen-rich gas over Ni-Y/AC catalyst in supercritical water at 650 °C, 28 MPa, and 12 h⁻¹ LHSV. Methane yield increased at the expense of hydrogen product by methanation reaction with increasing temperature above 650 °C.