

Glycerol steam reforming for renewable energy using Ni-based catalyst.

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In this study, We focused on the catalytic activity, kinetics of glycerol steam reforming (GSR) for hydrogen production over Ni/Al₂O₃ catalyst promoted by iron, cerium and supported over alumina. The GSR has been investigated in fixed-bed reactor under atmospheric pressure. As fed material, 20 wt% glycerol solution was employed and the temperature range is 450–550°C. Ni-based catalyst was characterized by N₂ physisorption (BET method), X-ray spectroscopy (XRD), temperature programmed reduction with H₂ (TPR). Kinetic parameters for glycerol steam reforming over Ni-based catalyst were obtained in the kinetically controlled reaction regime to ensure the absence of heat and mass transfer limitations. We used the initial rate method to avoid carbon deposition on the surface of the catalyst in kinetics study. The glycerol reaction order and activation energy were calculated by using power-law and Arrhenius equation.