

Production of CO-rich Hydrogen gas from Glycerol Dry Reforming over La-promoted Ni/Al₂O₃ Catalyst

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ABSTRACT

Dry reforming of glycerol has been carried out over alumina-supported Ni catalyst promoted with lanthanum. The catalysts were characterized using EDX, liquid N₂ adsorption, XRD technique as well as temperature-programmed reduction. Significantly, catalytic glycerol dry reforming under atmospheric pressure and at reaction temperature of 1023 K employing 3 wt%La–Ni/Al₂O₃ catalyst yielded H₂, CO and CH₄ as main gaseous products with H₂:CO < 2.0. Post-reaction, XRD analysis of used catalysts showed carbon deposition during glycerol dry reforming. Consequently, BET surface area measurement for used catalysts yielded 10–21% area reduction. Temperature-programmed gasification studies with O₂ as a gasification agent has revealed that La promotion managed to reduce carbon laydown (up to 20% improvement). In comparison, the unpromoted Ni/Al₂O₃ catalyst exhibited the highest carbon deposition (*circa*33.0 wt%).

KEYWORDS: Carbon deposition; Dry reforming; Glycerol; Lanthanide; Syngas

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