

## عنوان مقاله:

Application of Aspen HYSYS for Predicting the Effects of Impurities on Thermodynamic Performance of Glycerol Autothermal Reforming for Hydrogen Production

## محل انتشار:

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## خلاصه مقاله:

Hydrogen production from glycerol via autothermal reforming (ATR) has been widely investigated. However, little is known about the influence of impurities in glycerol on thermodynamic performance of the process. This study focused on the effects of impurities in glycerol on hydrogen productivity, energetic and exergetic efficiencies. The model of the entire process was simulated under thermoneutral condition in Aspen HYSYS using pure glycerol (PG) and crude glycerol (CG) as feeds. The two cases were optimized for maximum hydrogen production. From the optimized results, the hydrogen production per mole of the feed was 4.937 and 6.160 for the case of PG and CG, respectively. The thermal and exergetic efficiency of PG as feed were computed as 79.51% and 57.04% while that of CG were obtained to be 77.7 and 54.08%, respectively. The exergy destroyed to produce 1 mole of H<sub>2</sub> was found to be 133.5kJ and 157.3kJ for the case of PG and CG, respectively. It could be concluded that the presence of other constituents in CG contributed to increase in hydrogen productivity by increasing the energy demand of the plant but due to increase in both energy and exergy input, they decrease both the thermal and exergetic efficiencies.

## کلمات کلیدی:

Efficiency, Energy, Exergy, optimization

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