عنوان مقاله:

Numerical Study of Methanol Steam Reforming with Different Power Law Kinetics

محل انتشار:

سومین کنفرانس ملی کاربرد CFD در صنایع شیمیایی (سال: 1390)

تعداد صفحات اصل مقاله: 11

نویسندگان:

E Omidbakhsh - *Faculty of Gas, Petrochemical and Chemical Engineering, Semnan University, Semnan, Iran*

F Hormozi - *Faculty of Gas, Petrochemical and Chemical Engineering, Semnan University, Semnan, Iran*

خلاصه مقاله:

Increased energy demand and environmental protection considerations promote the need for improved energy Conversion systems. Among these systems, fuel cells are attractive due to their low pollution, high potential efficiency and ease of recharging. The fuel cells need hydrogen or hydrogen-rich feed gas as fuel. Methanol is potentially a good source of hydrogen for mobile fuel cells. Steam Reforming of methanol has been usually used as the most economical technology for the production of hydrogen. One of the most controversial aspects for the kinetics of this reaction focus on the reaction order of methanol, water, hydrogen and carbon dioxide, that must be introduced in the rate expressions. In this work, an empirical power law rate equation was considered which was depended upon methanol, hydrogen, carbon dioxide and water partial pressures with our three proposed models. The effect of elimination of carbon dioxide and water partial pressures is considered. A three-dimensional model of the methanol Steam Reforming was proposed. The governing equations include mass, momentum, energy and species equations with three models for kinetics reaction. The governing equations were solved numerically. The molar fraction variations of the components produced with these three models of power law rate equation for the kinetics of this reaction is considered. It can be seen, Conversion efficiency of methanol was increased when the temperature increasing. The effect of the water content in the feed on the methanol Conversion was studied. The results show that .there is little change in methanol Conversion at the feed mole ratios

کلمات کلیدی:

Methanol, Steam Reforming, Power law kinetic, CFD modeling