Pressurized steam reforming of commercial diesel for solid oxide fuel cell application

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Hydrogen sources are on the rise as alternative energy with high potential for application to a variety of industrial fields. In particular, because diesel has relatively high energy density among fuels, it can be easily applied to transportation area and utilized for auxiliary power unit system (APU) such as truck, ship and submarine. There are three dominant diesel reforming methods: Steam reforming(SR), Partial oxidation(POX), and Auto-thermal reforming(ATR). In this paper, SR is investigated because SR has the highest hydrogen production capacity among reforming methods. In addition, SR is very effective at the pressurized environment because SR doesn't need to supply air(use only water as oxidant). Reactor was pressurized up to 5bar using back pressure regulator. CH_4 concentration dramatically increased on the theory of Le Chatelier's principle ($CO+3H_2 \rightarrow CH_4+H_2O$). This increased CH_4 contents in reformate can be used to control thermal management in SOFC. Also, stability on catalyst was improved in effect of kinetic increase as pressurizing reactor.