Supercritical Water Gasification of Isooctane as Model Compound for Gasoline

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PEM Fuel cells have drawn much interest in automobile with flaring up of the global warming issue. It uses hydrogen as a fuel and produces water only as a byproduct. In the transition period, one of the major barriers for the fuel cell development is how the current fossil fuel infrastructure can be used efficiently with the changing of technology. Gasification by a compact reformer allows generating hydrogen from the fossil fuels sources that can be used on-board an automobile. Gasification in supercritical water has received much attention due to its unique physical properties and possibility to develop compact gasification system. In this work, experiments were conducted to investigate the gasification as a model compound for gasoline in supercritical water at 600 – 650 °C and 25 MPa. The gasification was carried out at continuous high-pressure tubular reactor that has inclination around 14.7° to give better flow rate stability of gas and liquid. The results show that the gaseous products were hydrogen, carbon monoxide, carbon dioxide, methane, ethane and propane. The effect of reactor temperature, ratio of water and isooctane and residence time on gas yield and composition was investigated and the results are presented.