Temperature Programmed Surface Reaction (TPSR) Studies of Autothermal Reforming of Diesel and Accompanying Coke Formation

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Abstract

In recent years hydrogen has emerged as an alternative clean energy source. Efficient generation of hydrogen is an important technology for commercialization of fuel cells for homes and cars. The high temperature associated with the production of hydrogen by steam reforming also favors the formation of coke. Some forms of carbon result in loss of catalytic activity and some do not. Coking is a more serious problem with heavy hydrocarbons such as gasoline and diesel.

Temperature Programmed Surface Reaction (TPSR) is a thermo-analytical technique in which some characteristic property of a solid sample is related to its temperature in a process of programmed heating. A TPSR system with a mass spectrometer (MS) detector was built to be use in this research project. The MS provides total monitoring of the outlet gas composition. Additional fundamental insights on the surface structure, surface reaction intermediates and the surface reaction mechanisms are expect to be found with the TPSR/MS.