

King Fahd University of Petroleum & Minerals

Chemistry Department

Seminar

Speaker

Dr. Shakeel Ahmad

Center for Refining & Petrochemicals, RI

KFUPM

Title

Catalyst by Design: Development of a reforming catalyst for hydrogen production

Abstract

Hydrogen is gaining increasing importance as an ultimate clean and high calorific value energy source, especially for the use in fuel cells. Among various known methods of hydrogen-production, the large-scale commercialized production is almost limited to steam reforming of natural gas or methanol. Finding alternative, more efficient, and technologically convenient methods of hydrogen production using compact reformers is in high demand for mobile as well as stationary fuel cell applications. A Ni-based seven-component composite catalyst has been developed for thermo-neutral reforming of liquid hydrocarbons to produce hydrogen rich syn-gas. The catalyst structure has been designed with the highly enhancing hydrogen spillover effect to avoid both coke formation and sulfidation of the catalyst components. The catalyst has not only the functions of reforming but also catalytic combustion. The energy produced by the combustion reaction elevates the catalyst-bed temperature up to 800 - 900 °C within a very short period of time. Simultaneously, steam reforming is induced while suppressing excessive rise of catalyst temperature. This thermo-neutralization on the same catalyst surface maintains the reactions stable without the requirement of an external heat source. Typical results obtained by the

thermo-neutral reforming (TNR) method in a micro-reactor with various feedstocks for hydrogen production will be presented, focusing on the features and performance of the novel catalyst. Three US patents have been granted for this novel catalyst and the process.

Day

Wednesday

Date

February 12, 2014

Time

11:00 AM

Place

Building 4 - 125



There will be a get-together with **Refreshments** between 10:45-11:00 am in B4 - 125

Courtesy: SAICSC-ACS

ALL ARE CORDIALLY INVITED

Dr. Mohammad Nahid Siddiqui, Chair, Seminars and Social Activities Committee