הטכניון - מכון טכנולוגי לישראל

TECHNION - ISRAEL INSTITUTE OF TECHNOLOGY

הפקולטה להנדסה כימית
ע"ש וולפסון
The Wolfson Department of Chemical Engineering

Wolfson Department of Chemical Engineering Special Seminar
Lecture Hall 6, Wolfson Department of Chemical Engineering,
Wednesday September 5th at 1:30pm

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Catalytic Pollutants Abatement from Nitrogen Based Fuel Combustion

Most of the world energy today is generated by burning conventional fossil fuels, such as petroleum, coal and natural gas. The world ever-growing population is leading to an increasingly energy demand and consumption, which is estimated to more than double by 2050 and more than triple by the end of the century. The growing energy demand will result in significant increase of pollutants emmission to the atmosphere that may cause severe environmental problems including global warming, climate change, acid rains and smog formation. For these reasons, nitrogen based compounds have been proposed as an alternative fuels. One candidate is low carbon aqueous solution of urea and ammonium nitrate (UAN). Although theoretically UAN combustion should emit only H_2O, N_2 and CO_2, in practice a wide spectrum of pollutants can form, including NH_3, N_2O, CO and NO_x. A post combustion catalytic converter can be used to reduce the pollutant levels below regulations. An experimental system including combustion reactors coupled to on-line FTIR gas analyser were used to examine the catalytic abatement activity of four nobel metals (Ru, Rh, Pd and Pt) under varied conditions and two different experimental configurations. The first is a hollow stainless steel reactor tube and the second is the same tube which has a co-axial thermocouple tune along it, creating annular flow cross section. High surface area γ-Al_2O_3 was chosen as support the material. With the first configuration it was found that Rh outpreformed the Pd, Pt and Ru based catalysts at higher pressure and temperature. However, with the second configuration both Ru and Rh showed much better results at the same conditions. These results meet the environmental protection agency (EPA) emission regulation stadards and provide significant insights for future implementaion of alternative fuel systems and their clean applications.

Refreshments will be served at 1:15pm