# Academic Report

**Speaker**：Hyungtaek Kim, Ph.D. Professor, Div. of Energy Systems, Ajou University, S. Korea

**Title**：Coal ash fouling behavior in the gasification environment

**Time**：13:00-14:00(pm) July 22, 2011

**Place**：Room 312, IPE Mansion

## Abstract

Ash ingredient of coal are occasionally deposited into heat transfer area and caused the major downtime during the operation of coal gasification plant. To evaluate the propensity of ash fouling, experimental study was conducted in Energy Process Laboratory, Ajou University. Experimental investigation has been conducted with wide range of coal sample (from Lignite up to Bituminous) to determine the ash deposition under coal gasification condition by using drop tube furnace (DTF), in which behavior of coal particle in actual gasification condition can be investigated. The ash particles are deposited onto sample collector by impacting and agglomerating action. Deposit ash samples are collected, weighed, and analyzed to determine the amount and composition of the deposit. Collected samples are further analyzed with X-ray fluorescence (XRF) for the compositional analysis of different layers. The deposited samples are also analyzed with scanning electron microscopy (SEM) and X-ray diffractometer (XRD). Experimental results showed that Na, K compounds contribute to initial deposition. It is also found that Mg, Ca and Fe components are generally considered as dominant components governing the total amount of ash deposition among alkali and alkaline earth minerals. Throughout the theoretical consideration as well as experimental data, several fouling index are developed which can predict the fouling behavior in the gasification environment.

# Resume of Professor Hyungtaek Kim


## Professor Hyungtaek Kim, Ph.D.

**Professor, Div. of Energy Systems，Division of Energy Systems, Ajou University San 5, Wonchon-dong, Suwon, S. Korea**


## *Professional Experience*

Assistant, Associate & Full Professor in Division of Energy Systems, Graduate School, Ajou University (1992.12 - Now)

Chairman of Korea Gasification Technology Council (2010.12 – Now)

Director of Institute of Energy & Climate Change, Ajou University (2008.9 - Now)

Expert Advisor, Energy Technology Planning Group, Korea Energy Management Corporation (2007.3 – 2008.2)

Visiting Professor of Combustion Laboratory, University of California at Irvine, USA. (2000.3 -2001.2)

Research Professor of Electric Energy Research Laboratory, Institute of Advanced Engineering (1992.12 – 1994.12)

Senior Researcher in Energy & Environmental Division, Korea Institute of Energy (1989.5-1992.12)

Senior Engineer in Center for Applied Energy Research, University of Kentucky, USA (1985.6 – 1989.4)

## *Education*

Dept. of Chemistry, Yonsei University , B.S., 1976.2

Dept. of Chemistry, Yonsei University, M.S., 1978.8

Thesis Title: A Study on the Electrical Conductivity of the MgO – TiO2 System

Dept. of Fuel Science, Pennsylvania State University, M.S. 1983.3

Thesis Title: Temperature and Particle Size Dependence of Sodium Bicarbonate Inhibition of Methane/Air Flames

Dept. of Fuel Science, Pennsylvania State University, Ph.D. 1985.8

Thesis Title: Particle Size Effects on Combustion Characteristics of Pulverized High-Volatile Bituminous Coal

## *Selected Honors*

Award for Honorable Mention to Technical Poster “Investigation of Slag Formation Mechanism by Using DTF” 17th Annual International Pittsburgh Coal Conference,

Sept. 12-14, 2000 in Pittsburgh, PA, USA

Minister’s Award in R&D of Alternative Energy, Ministry of Commerce, Industry & Energy, Korean Government, November 7, 2002

Award for Best Technical Paper “Optimization ofCO2 Absorption Process with MEA Solution’, The Korea Federation of Science and Technology Societies, May 19, 2005

Academic Award in Korean Energy Engineering Society, November 23, 2006