PURDUE UNIVERSITY | Materials Engineering
COLLEGE OF ENGINEERING

Materials Engineering
MSE 690
Fall 2019
Seminar Series

Monday, Sept. 23rd

3:30 pm Snacks

3:45 pm Presentation

ARMS 1010

Lightweight Materials for Automotive Applications: Challenges and Solutions

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Technology Mentor, Mirakle51

Abstract: Cars and trucks driven in the U.S. account for about two thirds of GHG* emissions from the U.S. transportation sector, which produces nearly 30% of all U.S. global warming emissions. In 2012, the U.S. Government announced strict CAFÉ** standards, requiring that the U.S. auto fleet average 54.5 mpg by 2025. As the World moves to tighten vehicle fuel-efficiency standards and promote the development of electric and hybrid vehicles, the Trump Administration is currently pursuing to rollback the Obama fuel target, freezing the minimum mpg standard at the 2020 level of 37mpg, which takes effect in 2021.

Lightweighting is the key issue and top priority for the U.S. and global automotive industry. Automotive engineers are increasingly adopting lightweight materials which have played an important role in reducing the mass of vehicle and improving its fuel economy. Typically, a 10% reduction in vehicle weight can lead to an increase of fuel economy by about 6-8%. The development of low-cost Al and Mg should provide significant opportunities for application in automobiles. The average Al content per vehicle has increased continuously from 397 lbs. (10% of curb weight) in 2015 to 466 lbs. (13%) in 2020 and expected to reach to 520 lbs. in 2025. Recently automakers open eyes in advanced high strength steel (AHSS) applications due to its strength, lightweight, affordability and sustainability. This presentation reviews challenges and solutions of light metals for automotive applications.

* Green House Gas
** The Corporate Average Fuel Economy

Biography: Dr. Sooho Kim is a graduate from Purdue MSE with his M.S. degree in Metallurgical Engineering in 1980 and a recipient of Outstanding Materials Engineer Award, Purdue University in 2000. He received his B.S. and Ph.D. from Seoul National University in 1974 and University of Illinois at Urbana-Champaign in 1985, respectively. He has over 35 years of automotive R&D experience in the U.S. and Korea including his 25-year tenure as a Researcher at General Motors R&D Center in Warren, MI. He led the Advanced Materials Research & Implementation Center as Director of Korea Institute of Materials Science (KIMS) and was in charge of Global R&D Operations as President/CTO at Alantum Corp. After returning to the U.S. in 2014, he served as Executive Technical Advisor for POSCO. His role was to promote the solution marketing for POSCO automotive steel sheets in North America. Currently he is President/Engineering Consultant at KIM AAM (Advanced Automotive Materials) Research and a Mentor (Technology) at Mirakle51. He holds 10 U.S./international patents and over 60 publications and conf. proceedings.