

Prof. Han Soo Kim (GIFT)



Ph.D. (2002), POSTECH, MSE

Thesis: The Nature of Complex Inclusions Comprising Oxides and MnS in Low Carbon Mn/Si/Ti Deoxidized Steels



2015-Present

Research Associate Professor, GIFT, POSTECH, Korea

2006-2015

Research Assistant Professor, GIFT, POSTECH, Korea

2005-2006

Research Associate, Eco-materials Center, National Institute for Materials Science, Japan

2003-2005

Research Associate, Steel Research Center, National Institute for Materials Science, Japan

2002-2003

Post-doctoral research fellow, Dept. of Materials Science and Engineering, POSTECH, Korea



- Low Density Steels
- Novel Ferrous-alloy Design
- Physical Metallurgy of Steels

2017
Fall Semester

GIFT Seminar

Time: Nov. 30th 4:30~5:45pm

Location: GIFT Auditorium #101

Speaker: **Prof. Han Soo Kim (GIFT)**

Host: Prof. Chang Hee Yim

<http://gift.postech.ac.kr>

Material Properties for the Mobility of 21C and Design of High Modulus Steels

The performance of an automotive structural component, in most cases, is not limited by a single property but by a combination of multiple properties. The weight of a sheet material is determined by the density and thickness of it. And the thickness of an automotive sheet material is decided by a set of requirements to meet design-strength and -stiffness of a component. Thus, construction of a light automotive component requires a light material which can carry design loads without failing and/or elastically deflecting too much—that is to say, weight reduction performance of the component is limited by a combination of three properties: density, strength and stiffness.

Recent studies on low-density steels have proven the effectiveness of aluminum alloying in increasing the specific strength (strength-to-weight ratio) by reducing density. However, with increasing aluminum content to decrease the density in high aluminum low-density steels (HALDS), elastic modulus mostly decreases. This makes it difficult to enjoy the benefit of increased specific strength because the lightweighting potential by use of “stronger-and-thinner gauge” diminishes with the reduction of stiffness. In order to overcome this critical drawback of modulus reduction in HALDS, recently, the concept of ceramic reinforced high modulus steel matrix composites has attracted extensive research attention owing to their possibility of blending the beneficial property profiles of steel matrix with stiff and light ceramics.

In the lecture, lightweighting potential of various structural materials will be compared in order to assess their competitiveness as future automotive materials. Also, the concept of high modulus steels will be introduced. Then, a novel approach to increase the stiffness of metallic alloys will be proposed.