SAMSONOV MEMORIAL INTERNATIONAL LECTURE SERIES ON INORGANIC MATERIALS

10th Annual Lecture

DEPARTMENT OF MATERIALS SCIENCE & ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY KANPUR

Research Challenges For Vehicle Lightweighting

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Date: Sep. 24, 2021 | **Join Zoom Meeting** | **Time: 5:30 PM**

https://us02web.zoom.us/j/85470236045?pwd=eXkyTW1pUTgvSzdtRi9SdjlDdjNXUT09
Meeting ID: 854 7023 6045 **Passcode:** hv8FUF

About the Speaker

Dr. Anil K. Sachdev is currently Principal Technical Fellow and Lab Group Manager at GM Global Research and Development where he started his career in 1977 after receiving his BSc in Metallurgical Engineering from Banaras Hindu University, his MSc in Metallurgical Engineering from Purdue University and ScD in Materials Science and Engineering from Massachusetts Institute of Technology. His research interests include microstructure design of aluminum and magnesium alloys, metal matrix-composites, and high strength steels for structural applications. The various projects he is leading are focused on improving performance of materials and designs to reduce component mass for improved energy efficiency. Most recently he is leading materials developments related to Additive Manufacturing for high volume automotive applications. He has presented several related keynote talks in International conferences and has been a Key Reader for Metallurgical and Materials Transactions for the past 40 years. He has 100 patents and 100+ external publications related to light metal developments and has received best paper awards and product recognition awards from AFS, TMS, NADCA, IMA for his work.

Abstract

Vehicle lightweighting is an important contributor towards enhancing battery range in electric vehicles or improving fuel economy in traditional internal combustion engine vehicles. Implementing aluminum and magnesium to substitute for steel, the current predominant material, poses many challenges including cost and performance. This talk will highlight current research to address these challenges, including alloy and process development, fundamental corrosion studies related to microstructure, and multi-scale plasticity modeling. Special deformation experiments inside a scanning and transmission electron microscope to understand the influence of microstructure on plasticity will be detailed.

Professor G.V. Samsonov (1918-1975)

Professor Grigorii Valentinovich Samsonov was born on 15th February 1918 in a town near Leningrad (now St. Petersburg). After earning his first degree at the Nonferrous Metals Institute in Moscow, he joined Soviet Navy. At the end of the Second World War, he was stationed in the Soviet occupied zone of Austria. It was here he became intimately connected with the extensive refractory metal and their compounds.

After the cessation of the war, Samsonov returned to Moscow and resumed his higher studies and research under the guidance of Professor M. A. Merson (Institute of Steel and Alloys), a noted powder metallurgist of the then USSR. After completion of his Ph.D. degree, Samsonov joined the Institute of Metalkeramika (powder metallurgy) in the Ukrainian Academy of Science at Kiev as a senior scientist. The Institute was later renamed 'Institute of Materials Problem'. Within few years, he was elevated to the post of Deputy Director. Simultaneously, he was invited to head the Powder Metallurgy Department of Kiev Institute of Technology. Samsonov's scientific activity began with the synthesis of inorganic compounds. Soon he extended his area in the study of structure-properties-processing-performance relations of inorganic materials. By structure he included all types: electronic, atomic, micro- and macro, although the electronic structure fascinated him the most. To achieve this goal he insisted on the crucial bond between chemistry and physics. Samsonov authored nearly 1500 papers and authored/edited 50 books and monographs. One of the seminal books authored by Samsonov is 'Configurational Model of Matter'. Probably, there is no paper on refractory compounds, where he is not referred. The inorganic compounds in which Professor Samsonov contributed were carbides, nitrides, borides, silicides, germanides, selenides, phosphides, etc. He has also investigated in detail the hard cermets based on refractory compounds. His numerable past students are spread throughout the world.

About the Donor (1939-2020)

Prof. Gopal Shankar Upadhyaya joined the department of Metallurgical Engineering (now Materials Science and Engineering) at the Indian Institute of Technology Kanpur as Professor in the year 1976. Prior to that he was Associate Professor at the University of Roorkee (now IIT Roorkee) from 1964-1975.

He was awarded doctorate degree from the Kiev Institute of Technology, Ukraine in 1969 under the guidance of internationally renowned Materials Scientist Professor G.V. Samsonov. Professor Upadhyaya's publications list exceeds 300 papers and 16 authored/edited books. He has served on the Advisory Boards of practically all the major conferences and journals in powder metallurgy. Professor Upadhyaya's past graduate and doctorate students are actively engaged in powder metallurgy research and industry. He retired from IIT Kanpur in 2001, Professor Upadhyaya passed away on 19 July 2020 in Varanasi due to age-related ailments. He is survived by his wife and two sons.

Previous Speakers

2012 : Professor E.J. Mittemeijer (Max Planck Institute for Materials Science, University of Stuttgart, Stuttgart, Germany)
2013 : Professor G.S. Upadhyaya (Formerly, Professor IIT Kanpur)
2014 : Professor R.A. Andrievski (Institute of Problems of Chemical Physics, Russian Academy of Sciences)
2015 : Professor K.A. Padmanabhan (Formerly Director IIT Kanpur)
2016 : Professor H. Danninger (Technische Universitat Wien, Vienna, Austria)
2017 : Professor P. K. Rohatgi (University of Wisconsin– Milwaukee, USA)
2018 : Dr. S. V. Kamat, (Defence Research Development Organization, India)
2019 : Dr. Janusz S. Konstanty, Professor at AGH-University of Science & Technology, Krakow, Poland
2020 : Dr. Amol A Gokhale, Professor at Indian Institute of Technology, Bombay