



# Samsonov Memorial International Lecture Series on Inorganic Materials

## Seventh Annual Lecture

Department of Materials Science and Engineering  
Indian Institute of Technology Kanpur

### MATERIALS FOR HYPERSONIC CRUISE VEHICLES

**Dr. Samir V. Kamat**

Director General, Naval Systems and Materials  
Defence Research and Development Organization (DRDO)

**Day: 23 April 2018      Place: L-8      Time: 4:00 PM**

#### Abstract

Materials technology is one of the key technologies to realize hypersonic cruise vehicles. Several technological innovations in high temperature materials as well as coatings have happened over the years to meet the extremely demanding requirements of high heating rates and temperatures achieved during hypersonic flight. In this talk the materials and testing capabilities developed at the Defence Metallurgical Research Laboratory for a long duration hypersonic cruise vehicle will be highlighted.

#### About the speaker



Dr. Samir V. Kamat received his B.Tech in Metallurgical Engineering from IIT Kharagpur in 1985 and Ph.D from Ohio State University in 1988. He is currently the Director General, Naval Systems and Materials, Defence Research and Development Organization (DRDO). He has also served as a Scientist and Director at Defence Metallurgical Research Laboratory, Hyderabad where he worked on the development of various advanced materials for defence applications. He has published more than 180 papers in peer reviewed International Journals.

#### Professor G.V. Samsonov (1918-1975)



Professor Grigorii Valentinovich Samsonov was born on 15<sup>th</sup> 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



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. After retiring from IIT Kanpur (in 2001), Professor Upadhyaya currently resides in Varanasi.

#### 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 Universität Wien, Vienna, Austria)

**2017: Professor P. K. Rohatgi** (University of Wisconsin–Milwaukee, USA)