



Invitation



ASM International Pune Chapter and **Indian Institute of Metals**, cordially invite you for ASM—IIM lecture on

**Novel Structural Materials for
Multifunctional and Sustainable Applications**

By

Surojit Gupta, PhD

**Advanced Materials Research Group,
Mechanical Engineering Department,
University of North Dakota, USA**

Venue: ASM Office, Guruprasad, 37/4/A, 6th Lane Prabhat Road
Deccan Gymkhana Pune 411004.

Date: Wednesday **28th Dec 2016** at **6.30 pm** sharp.

Subhash Kulkarni
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Rahul Gupta
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ASM Pune Chapter

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Indian Institute of Metals

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Pune Chapter

About the Program :

Hi Tea & Registration	6.30 - 7.00 pm
Technical Presentation	7.00 - 8.15 pm
Q&A Session	8.15 - 8.30 pm

About the Speaker:

Dr. Surojit Gupta is an Assistant Professor of Mechanical Engineering in the University of North Dakota. He is also an Adjunct Professor in the Henan Polytechnic University, China. He has published over 40 technical papers, 6 patents (granted and pending – US and International), and has given 19 invited/keynote talks and over 50 contributed presentations in several international, national and local conferences. He also has an h-index of 21 and 1300 citations. Previously, Dr. Gupta was employed in The Rutgers University. Prior to that, he was a postdoctoral fellow in The Pennsylvania State University. Earlier, Dr. Gupta finished his doctoral studies from Drexel University and Undergraduate studies in University of Calcutta. Dr. Gupta has been a visiting researcher and/or collaborated with TAG Inc., Honeywell International, Solidia Technologies, Corning Inc., Villanova University, and Tata Institute of Fundamental Research.



Dr. Gupta has been an active member of the ASM, ACeRs, and Sigma Xi. Dr. Gupta is a member of the award committee of, (a) the Engineering Ceramics Division (ECD) and (b) Robert L. Coble Award for Young Scholars (2015-20). Recently, Dr. Gupta was elected as the secretary elect of the Engineering Ceramics Division (ECD) of ACeRs.

About the topic:

In this presentation, Surojit will present research findings on three different areas of materials research: (a) MAX phases (novel natural laminates) and their composites, (b) novel sustainable structural materials, and (c) green and additive manufacturing.

During Part A, recent results on the mechanical behavior of MAX and their composites will be presented. Briefly, $M_{n+1}AX_n$ (MAX) phases (over 60+ phases) are thermodynamically stable nanolaminates displaying unusual, and sometimes unique, properties. These phases possess a $M_{n+1}AX_n$ chemistry, where n is 1, 2, or 3, M is an early transition metal element, A is an A-group element, and X is C or N. The MAX phases are highly damage tolerant, thermal shock resistant, readily machinable, and with Vickers hardness values of 2–8 GPa, are anomalously soft for transition metal carbides and nitrides. MAX phases display nonlinear, hysteretic, elastic behavior due to kink band formation in the basal planes. Recently, it was demonstrated that MAX Phase-based composites can be used as shafts against SA (Super Alloys) foils for different foil bearing applications at 50,000 rpm from RT till 550°C during thermal cycling. Thus, there is a huge potential that these materials can be used for different tribological and engineering systems, for example, air-foil bearings, gas turbine seals, cylinder wall/piston ring lubrication for low-heat rejection diesel engines, various furnace components, among many others. During Part B, recent studies about the development of novel sustainable materials will be presented. This part will focus on the development of green cements. During Part C, novel practices for enhancing green manufacturing (GM) and additive manufacturing (AM) will be discussed.