



## TITLE

**Graphene/Multiwalled Carbon Nanotube Reinforced Alumina and Silica Based Nanocomposites: Development, Characterization and Mechanical Behaviour Study**

## ABSTRACT

Ceramics like alumina ( $\text{Al}_2\text{O}_3$ ) and silica ( $\text{SiO}_2$ ) serve as potential candidates for several structural and mechanical applications owing to their high-temperature stability, high hardness, good compressive strength, exceptional oxidation resistance and relatively low density. However, this attractive combination of properties in monolithic  $\text{Al}_2\text{O}_3$  and  $\text{SiO}_2$  is impaired by few drawbacks, namely, high brittleness, very low fracture toughness and mechanical unreliability, which limit their use in various applications. With the advent of nanoparticles, research interest in ceramic matrix composites (CMCs) is now changing from classical reinforcements (microscale fillers) to new types of reinforcements at nanoscale. With the introduction of carbon nanotubes (CNTs) and graphene, tailoring the ceramic structures at nanometric level for the development of tougher and wear resistant ceramic matrix nanocomposites (CMNCs) is the latest trend in composite industry.

This talk will provide an overview on the effect of graphene and MWCNT reinforcement on the mechanical properties like microhardness, fracture toughness, surface roughness and wear behaviour of various  $\text{Al}_2\text{O}_3$  and  $\text{SiO}_2$ -based nanocomposites. Further, the effects of various sintering parameters like sintering route, sintering time, sintering temperature, holding time and sintering atmosphere on the mechanical properties of the developed CMNCs would also be addressed.

## SPEAKER

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Dr. Sharma is an Institute Postdoctoral Fellow, in Department of Material Science and Engineering, IIT Kanpur, where she is working on the development of 2D-alloy hybrids for energy and environmental applications. She has defended her Ph.D. thesis in April, 2019 from National Institute of Technology, Rourkela on mechanical behaviour analysis of alumina and silica-based nanocomposites reinforced with graphene and MCNTs. She obtained her Master's degree in Metallurgical and Materials Engineering from National Institute of Technology, Durgapur and her bachelor's in Mechanical Engineering from Uttar Pradesh Technical University, Lucknow. Her research interest includes processing of advanced ceramics, synthesis and characterization of 2D and 1D materials, wear, tribological and mechanical behaviour analysis of composite systems.