

## **Electroconductive metal oxide ceramic composites**

The properties of graphene open new opportunities for the fabrication of composites exhibiting unique structural and functional capabilities. However, to achieve this goal we should build materials with carefully designed architectures. The development of new technologies in key areas from construction to transportation to energy generation increasingly demands new structural materials with improved performance. These materials will not only have to be lighter, stronger and tougher but also play additional functional roles, including sensing external stimuli, self-monitoring their structural integrity, conducting electricity and storing energy. It is becoming evident that monolithic materials cannot meet these stringent demands. Therefore, current focus is at the development of new composites as a solution to meet the challenge.

The presentation will cover topics on current state-of-the-art in development of electroconductive metal oxide ceramic composites added by graphene or graphene oxide for a wide variety of different applications. As graphene has demonstrated exceptionally high mechanical properties, a tremendous number of research works concentrate on graphene-reinforced composites of increased toughness and damage resistance; however, added value from functional properties is much less discussed. The presentation will cover electrical and thermal properties of the ceramic composites that may be used not only for structural, but also for functional applications.

Moreover, the concept of bioinspired mineralized composites exhibiting complex anisotropic architectures with layered or fibrous motifs will be introduced.