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Behaviour of Two-Dimensional Layered Heterostructures of Graphene-Supported Transition-Metal Oxide Nanostructures for application of Photovoltaics over CNTs Filled Carbon Fibre Composites.

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Abstract:

The unusual properties of graphene and transition metal oxides (TMOs) have attracted the attention of researchers. They are trying to combine graphene and TMOs on a single platform. Looking at the success of two dimensional heterostructures of graphene and transition metal dichalcogenides, researchers are trying to form two dimensional heterostructures of graphene and TMOs rather than just compositing these two ingredients. It brings extra functionalities in the material, mainly due to the interfacial density of states and two-dimensional electron gas. The physical and quantum properties of different layers can combine, interfere and cancel each other which lead to the generation of new properties. This review will focus on the recent progress in the field of two-dimensional heterostructures of graphene/TMOs. Firstly, the chemistry aspects of graphene/TMOs heterostructures that are responsible for its enhanced properties, will be discussed. Wet chemical approaches for the bottom up synthesis of 2D graphene/TMO heterostructures are also discussed. This article then focus on tunable properties of graphene/TMO heterostructures and how that tunable properties can be used for specific applications like supercapacitors, lithium ion batteries, photocatalysts, photovoltaics, electronics, and biosensing. After discussing applications, challenges for their commercial utilization and future perspectives have been discussed.

Biography:

Completed, undergraduate, master and Ph.D degrees in Mechanical Engineering from Indian Institute of Technology(BHU), Varanasi, India and postdoctoral from University of Bath, UK; QMW, London; and MPA, University of Stuttgart, Germany. Published more than 176 papers in peer reviewed international journals. Collaborated various international projects with UK, USA, Germany, Australia, Japan, South Korea, Italy, Czech Republic, Poland and France. Presently FOUNDER PRESIDENT of "ICRACM SERIES" international conference and Adjunct Professor, Faculty of Industrial Science & Engineering, Swinburne University of Technology, Victoria, Australia, Received distinguished visiting fellowship of Royal Academic of Engineering UK in 2018.

Speaker Publications:

1. Evaluation of oxidative stress and antioxidant status: Correlation with the severity of sepsis; S Kumar, E Gupta, S Kaushik, V Kumar Srivastava, SK Mehta, A Jyoti; Scandinavian journal of immunology 87 (4), e12653
2. Insights into the GTP/GDP Cycle of RabX3, a Novel GTPase from Entamoeba histolytica with Tandem G-Domains; M Chandra, M Mukherjee, VK Srivastava, Y Saito-Nakano, T Nozaki, ...; Biochemistry 53 (7), 1191-1205
3. Quantification of NETs formation in neutrophil and its correlation with the severity of sepsis and organ dysfunction.; Kumar, S., Gupta, E., Kaushik, S., Srivastava, VK., Saxena, J., Mehta, S ...; Clin Chim Acta

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