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Graphene oxide/epoxy carbon fibre-reinforced composites

Epoxy resins are widely used in fibre-reinforced composites due to their superior thermal, mechanical, and electrical properties. There is however continuous demand to improve the performance of these composites in high performance applications due to increasingly demands for lightweight composites under stringent functional requirement especially for mechanical performance. The development of improved high performance composites based on epoxy polymers can primarily be achieved by simultaneously improving resin, fibre and interface properties. Depending on the chemical compositions and curing kinetics, it is possible to vary their mechanical properties ranging from extreme flexibility to high strength and hardness, and physical properties such as adhesive strength, chemical resistance, heat resistance and electrical resistance. The modification of epoxy resins with graphene oxide could endow the materials with some superior properties such as broadening of the glass transition temperatures, modest increases in the glassy modulus, low dielectric constant, and significant increases in key mechanical properties. In the last decade years, some studies have shown the potential improvement in properties and performances of fibre reinforced polymer matrix materials in which graphene oxide were incorporated. From the existing literature, considerable effort has been given to the synthesis and processing of these unique polymers, but relatively little work has focused on the graphene oxide/fibre reinforced epoxy composites. The purpose of this work, therefore, is to capture recent developments in epoxy-fibre reinforced composites manufactured using graphene oxide family for reinforcement. The presentation will explore the challenges, opportunities and potential applications.

Biography

James Njuguna is the Strategic Lead for Research and Professor of Composite Materials at Robert Gordon University. He has a long-standing interest and extensive research experience in composite materials (and nanomaterials) for structural applications primarily focusing on transport and oil, and gas sector applications. His research focus on composites reinforcement, design and optimization to achieve desired functional performance. He has edited/co-edited six books, contributed 21 book chapters and published over 150 journal and conference publications.

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