

STUDIES ON MECHANICAL PERFORMANCE AND ELECTROMAGNETIC SHIELDING EFFECTIVENESS OF ELECTROSPUN FIBER/ EPOXY COMPOSITES

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By

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ABSTRACT

Electrospinning technique is a proven and matured nanofabrication process due to its special characteristics. These fibers have unique features that make them useful in a wide range of applications. These fibers act as excellent reinforcements, due to their high surface area and aspect ratio. The main objective of this research work is to explore the role of electrospun fibers in epoxy matrix and investigate their performance. For this purpose, electrospun fibers were made from poly(styrene-co-butadiene) (SBC) and polyimide and their epoxy composites were prepared and characterized. These composites were observed to have enhanced mechanical and fracture properties, without compromising the comprehensive properties. Electrospun carbon fibers with zirconia and titanium carbide (TiC) @ titania (TiO₂) core-shell structures were prepared from carbonizing the polyacrylonitrile (PAN) fibers. These fibers were used as reinforcements in epoxy matrix and composites were made. These carbon fiber loaded epoxy composites with fillers were observed to have good EMI properties along with enhanced mechanical properties. The results demonstrate that the prepared filler loaded carbon fibers have tremendous potential to be used as effective EMI shielding materials and further carbon fiber loaded epoxy composites can be employed as potential structural EMI shields