

USAGE OF NANO COMPOSITE AS FILLER MATERIAL IN AEROSPACE COMPOSITE MATERIALS

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ABSTRACT

The application of nanotechnology in engineering materials is used to enhance the mechanical & physical properties. In recent days many fillers are used to increase the tensile, flexural, hardness, impact strength, etc. The prime objective of this project is to enhance the mechanical properties of the laminate composite by adding Nanoparticles under various environmental conditions. The Titanium dioxide (TiO₂), Silicon dioxide (SiO₂), Aluminium oxide (Al₂O₃) are prepared by using Solgel process by using suitable Precursor. The synthesized Particles used separately in different proportions as fillers with matrix mixers. From previous studies the filler materials as nanoparticles will increase the strength of the matrix. In order to fabricate the composite material by using Glass fiber as reinforcement and Epoxy as matrix material. Thus the bond between the interface of matrix and the reinforcement (glass fiber) increases due to the addition of nanoparticles. Because of the effect of nanoparticles on the composite material, the UV resistance and the moisture resistance of the composite material also increase. And also the aging behavior of the composite material decreases. The Glass/Epoxy Composites are experimentally tested to find out the tensile strength, hardness, impact strength, deformation etc. The aluminium oxide provides better impact strength when compare to other filler materials. On increasing the filler material ratio there will be by contrast a decrease in strength up to a limit. Each filler material has its unique nature to increase the mechanical property. The silica oxide provides better tensile and flexural properties up to a 1% but aluminum oxides show an increase in the flexural modulus as we increase the filler volume ratio.

Keywords: Nanoparticle. Composites. Deformation. Tensile. SEM.XRD

