**Study of Interlaminar shear strength and Flexural strength of carbon fiber reinforced polymer composites modified with POSS particles**

**Archana Anand**

National Institute of Technology (NIT) Calicut, Kozhikode, India

*archanaanand94@gmail.com*

**Lokasani Bhanuprakashb, Soney Varghesea**

aDepartment of Mechanical Engineering, National Institute of Technology Calicut 673601, Kerala, India

bDepartment of mechanical engineering, MLR Institute of technology, Hyderabad, Telangana 500043, India

**ABSTRACT**

Composites exhibit weak mechanical strength even in the presence of fiber reinforcements due to submissive through-thickness properties. Incorporation of nanofillers compensates for this limitation by improving the surface area of interaction and initiating stronger bond formation. An enhanced refinement in properties can be achieved by addition of inorganic nanofillers in organic matrix. One such nanofiller that can be potentially employed is Polyhedral oligomeric silsesquioxane (POSS) nanofillers possessing a cage like structure with silicon core.

In this study, carbon fiber reinforced polymer (CFRP) composites were prepared with matrix modified by inclusion of glycidyloxy propyl dimethylsiloxy polyhedral oligomeric silsesquioxane (POSS) particles. The nanofiller loadings were varied as 0.05 wt%, 0.1 wt%, 0.25 wt% and 0.3wt% with respect to the matrix. The test samples were prepared using vacuum bagging technique and mechanical properties in terms of flexural strength and Interlaminar shear strength (ILSS) of the composites were analyzed. The mechanical properties of the CFRP composites possessing POSS nanofillers exhibited significant enhancement, with flexural strength and ILSS indicating an improvement by 72% and 53% respectively for 0.25 wt% nanofiller loading. SEM images of the fracture surface of the specimen were analyzed to account for the improvement in the interfacial interactions between the matrix and the reinforcement in the composites.

*Keywords: POSS nanofillers; Carbon fiber reinforced polymer (CFRP) composites; Flexural strength; Interlaminar shear strength; SEM*