

# **Experimental Characterization of Compressive Properties of Microwave Cured GFRP Prepreg Composites**

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Polymer composites have become one of the preferred structural materials in high-technology applications, such as defense, aerospace, and marine. Research interest has been increasing in developing fast and energy-efficient manufacturing techniques and way of curing these composites. Most of the research, however, has been targeting the tensile and flexural properties of composite laminates. It is therefore intriguing to investigate compressive properties of polymer composites cured by microwave radiation in comparison with conventional thermal techniques.

In the current paper, study on compressive properties of microwave cured glass fibre reinforced epoxy (GFRP) composites is covered along with the results of the thermally cured (autoclave) composites. Two ply lay-up sequences,  $[0/90]$  and  $[\pm 45]$ , of GFRP laminates were fabricated and cured in an autoclave, and also in a commercial domestic microwave oven at an operating frequency of 2450 MHz. The microwave curing was proven to be significantly faster than the thermal curing translating into significant energy and cost savings. The compressive properties of the microwave-cured  $[0/90]$  and  $[\pm 45]$  composites were found comparable to that of the autoclave cured ones. In fact, better compressive strengths were achieved for the microwave-cured laminates when the pressure applied during curing was even and led to uniform compaction. Fractographic analysis of the specimen carried out after the compression tests to observe the failure modes in both, the microwave and autoclave cured, composites is presented. The failure modes in microwave-cured specimen were found dominated by residual stresses; the reasons for which are discussed. Finally, the advantages of microwave curing process are highlighted and argued.

## AUTHOR BIOGRAPHY



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