PROCESSING STUDIES ON GLASS FIBRE/POLYPROPYLENE COMPOSITES

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INTRODUCTION

Fibre Reinforced Thermoplastics (FRTP) composites are fast emerging structural materials. Thermoplastics composites have many advantages over thermoset composites such as recyclability, higher impact and fracture resistance.
In the present work, processing studies on FRTP laminates produced by film stacking process are carried out. Effect of processing parameters such as mould temperature and pressure on mechanical properties is studied. Dynamic mechanical analysis is also carried out on these laminates.

ABSTRACT

Wakeman, etal (1998) studied commingled glass/polypropylene composites for optimized macro- and micro- mechanical properties. Sakaguchi, etal (2000) studied the effect of micro braiding structure and processing conditions for glass fibre/PA6 unidirectional composites. Joseph, etal (2003) studied the dynamic mechanical properties of short sisal fibre reinforced polypropylene composites containing both treated and untreated fibers.
In the present work, processing studies on glass/polypropylene composite laminates produced by film stacking process is carried out.
Reinforcement used is E-glass fibre woven roving (610 g/sq m). Thermoplastics matrix used is polypropylene (PP) film (0.50 mm thick). FRTP sheets produced by film stacking process had fibre volume fraction of 0.55.
FRTP sheets were produced using three pressure values (20, 40 and 60MPa) and for each pressure four temperatures were tried (180,190,200 and 210 deg C).
Effect of above processing parameters on mechanical properties viz. tensile, flexural, interlaminar shear and izod impact strength is studied.
Following observations are made from the above study:
-The processing conditions 40 MPa pressure and 190 deg C temperature gave optimum mechanical properties.
- Storage modulus of glass fibre/PP composites is much higher than PP alone.
- Peak tanδ value for glass fibre/PP is almost twice that of PP.
- Increase in frequency from 5 to 20 Hz affects storage modulus and loss factor. Marginally. Both storage modulus and damping increase with increase in frequency.

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