

CONTRIBUTION OF CELLULOSE FIBERS TO THE MECHANICAL PROPERTIES OF POLYSTYRENE MATRIX COMPOSITES

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Composites from recycled newspaper would result in the effective use of the waste product which is currently burned or land-filled, as well as potential reduction in the cost of manufactured composite. In this work, old newspaper (ONP) together with yellowish wood pulp and waste polystyrene from packaging were used to produce composite. The technique studied in this work is an alternative to the conventional melt compounding and was expected to provide efficient wetting of fibers by the polymer. Polystyrene was grafted with acrylonitrile, ethylmethacrylate and butylmethacrylate respectively using benzoyl peroxide as an initiator. The amount of polystyrene to monomer is 1:0.75 and to initiator is 1:1. The grafted polymers were characterized using thermal gravimetric analysis (TGA) and differential scanning calorimeter (DSC). Different ratios of waste polystyrene or grafted waste polystyrene were mixed with a blend of old newsprint and wood pulp to form composites. The mechanical properties of these composites as well as water uptake were studied. The tensile properties of the prepared composites did not show essential improvement, except for the modulus of elasticity. Scanning electron microscopy indicate that composites with grafted polystyrene showed more homogeneity than the composite with polystyrene and also than blank, so the grafted polymer is distributed very well improving the mechanical properties of the composites. Strong adhesion between the fiber and grafted polymer was found.

Key words: Old newsprint, composites, wood pulp, grafted polystyrene.