

Studies of monomer impregnation and polymerised in situ in wood using dynamic mechanical thermal analyser.

ABSTRACT

Ten tropical hardwoods are impregnated with methyl methacrylate and polymerised in-situ by use of catalysts and heat techniques. Treatability of the wood, as determined from the fractional volumetric retentions of monomers that are a fraction of voids filled by the impregnant, showed that the mean retention range from 15.03% (*Acacia Mangium*) to 56.59% (*Cratoxylum Arborescens*). The penetration of the monomer evaluated using ultrasonic waves showed that the treated wood had higher velocities which indicated significant increase in density. The present paper deals with the viscoelastic relaxation of polymerised treated wood. The efficiency of the monomer as a plasticiser is studied through the temperature dependence of the storage modulus (E') and loss tangent ($\tan \delta$) of treated and untreated wood by dynamic mechanical thermal analysis (DMTA) over a temperature in the range from -100 to 200°C . The storage modulus E' decreased with temperature and as the maximum mechanical damping developed, the glass transition temperature (T_g) of the plasticised wood decreased with the plasticiser content.

Keyword: Loss tangent; Storage modulus; Treatability; Ultrasonic velocity.