

Curing behaviour of unsaturated polyester resin and interfacial shear stress of sugar palm fibre

ABSTRACT

Studies on the effect of cobalt of unsaturated polyester resin and the effect of treated sugar palm fibre with sodium hydroxide on single fibre strength and interfacial shear strength (IFSS) are presented in this paper. 1% of methyl ethyl ketone peroxide was used as the initiator, while cobalt of variable percentages (0.05%, 0.1%, 0.2%, 0.4%, 0.6%, 0.8% and 1%) was used as the hardener. The effects on glass transition and exothermic reaction of unsaturated polyester were studied for post curing temperature determination using differential scanning calorimetry by heating the samples at 10°C/min heating rate from 30°C to 120°C with flowing of purge nitrogen gas atmosphere. For the single fibre test and IFSS, the treatment was carried out using sodium hydroxide solution with 1% concentration for one hour soaking time. Based on the optimisation percentage of cobalt, it was found that the higher the percentage of cobalt, the faster the sample tested to gel and cured. Treated sugar palm fibre exhibited better single fibre strength and IFSS between the matrices compared to untreated fibre due to the effectiveness of the alkali treatment. This can be attributed to the rearrangement of fibrils along the direction of tensile force and the removal of the coating layer and impurities after the alkaline treatment.

Keyword: Unsaturated polyester; Sugar palm; Curing characteristic; IFSS