

Flame retardant treated flax fibre reinforced phenolic composites: Ageing and thermal characteristics

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Abstract:

In this study, flax composites were prepared from flax fabric and phenolic resin. Chemical treatments were imparted to the fabric to improve adhesion between the fabric and the phenolic matrix. Diammonium phosphate was applied to improve the flammability of the composites. The thermal and flammability properties of the untreated, chemically treated, and flame retardant (FR) treated flax fabric reinforced phenolic composites were studied. Ageing studies were carried out by subjecting the composites to varying conditions of temperature and humidity in an environmental chamber for 2 weeks. FR treatment of flax fabric was shown to be very effective in improving flame retardancy of the composites due to decreased peak heat release rate (PHRR) and smoke production rate (SPR). Thermogravimetric analysis (TGA) of composites showed that after FR treatment, the decomposition temperatures shifted to lower temperatures. Ageing studies revealed that the mechanical properties of untreated, chemically treated and FR treated composites decreased with an increase in ageing temperature.