

Flammability, tensile and morphological properties of oil palm empty fruit bunches fibre /Pet yarn reinforced epoxy fibre retardant hybrid polymer composites

ABSTRACT

Oil palm empty fruit bunches (OPEFB) fiber is a natural fiber that possesses many advantages, such as biodegradability, eco-friendly, and renewable nature. The effect of the OPEFB fiber loading reinforced fire retardant epoxy composites on flammability and tensile properties of the polymer biocomposites were investigated. The tests were carried out with four parameters, which were specimen A (constant), specimen B (20% of fiber), specimen C (35% of fiber), and specimen D (50% of fiber). The PET yarn and magnesium hydroxide were used as the reinforcement material and fire retardant agent, respectively. The results were obtained from several tests, which were the horizontal burning test, tensile test, and scanning electron microscopy (SEM). The result for the burning test showed that specimen B exhibited better flammability properties, which had the lowest average burning rate (11.47 mm/min). From the tensile strength, specimen A revealed the highest value of 10.79 N/mm². For the SEM morphological test, increasing defects on the surface ruptured were observed that resulted in decreased tensile properties of the composites. It can be summarized that the flammability and tensile properties of OPEFB fiber reinforced fire retardant epoxy composites were reduced when the fiber volume contents were increased at the optimal loading of 20%, with the values of 11.47 mm/min and 4.29 KPa, respectively.

Keyword: OPEFB composite; Flammability; Fire retardant; Hybrid composite; Tensile; Morphology; Pet yarn; Epoxy