

Abstract

Eco-friendly composite made of Timoho Fiber (TF) continuously developed to get the best performance to replace plastic-based synthetic fibers. This study focuses on investigating physical characteristics, mechanical properties, thermal analysis, and the morphology of TF-reinforced polyester composites by adding organic (egg shell powder-ESP) and inorganic (aluminum powder-AP) fillers. Hot press method was used in the composite fabrication with considered volume fraction of TF, organic, and inorganic fillers. The results showed that the density of TF-polyester composites decreases with the increasing volume fraction of the fibers. For additional fillers, it was shown that AP was more effective to be used to improve density than ESP. The tensile and impact strength of the composite increased with increasing TF volume. However, the addition of ESP and AP fillers into the composite caused different mechanical characteristics. Filler addition increased the elasticity modulus, toughness, thermal resistance increased, while the tensile strength decreased. ESP and AP fillers provided the best thermal resistance due to the relatively high thermal conductivity of ± 1700 C compared to composites without fillers and amorphous ESP fillers. SEM observation supported the analysis of TF-polyester composite mechanical characteristics.

K E Y W O R D: Sinorganic filler, mechanic, organic filler, TF-polyester composites, thermal properties