

INTISARI

Bahan komposit saat ini sedang dikembangkan oleh industri otomotif sebagai panel eksterior mobil, terutama pada bumper mobil karena ringan dan dapat didaur ulang. Ada dua jenis komposit hibrida: yaitu, komposit hibrida menggunakan dua jenis serat dalam matriks, dan dua jenis matriks dengan jenis serat. Penelitian tentang komposit hibrida dengan dua jenis serat telah dipelajari secara ekstensif. Namun, beberapa studi tentang komposit hibrida menggunakan dua jenis matriks. Dalam penelitian ini, komposit hibrida serat kenaf dengan dua jenis matriks polypropylene (PP) dan high-density polyethylene (HDPE) dibuat untuk mempelajari pengaruh rasio PP / HDPE terhadap ketangguhan impak dari komposit.

Sebelum fabrikasi, serat kenaf diperlakukan dengan merendam serat kedalam 6% larutan NaOH selama 4 jam pada suhu kamar dan kemudian dipotong menjadi 6 mm. Fraksi volume serat dan matriks adalah 30%: 70% dan rasio PP / HDPE divariasikan menjadi 1:2, 1: 1 dan 2:1. Komposit hibrida dibuat dengan teknik *hand lay-up* dengan cetakan pres panas 165 °C - 180 °C dan 1800 psi selama 15 menit. Uji impak pada spesimen komposit dilakukan menurut ASTM D 5942. Mikroskop optik digunakan untuk mengkarakterisasi distribusi serat dan permukaan patahan.

Hasil penelitian menunjukkan bahwa ketangguhan dampak tertinggi 0,028 J/mm² dicapai oleh komposit hibrida kenaf /(1PP + 2HDPE). Peningkatan fraksi volume HDPE meningkatkan ketangguhan impak komposit. Distribusi serat dalam matriks tampaknya seragam di semua komposit dengan hampir tidak ada void yang ditemukan, sebagaimana dikonfirmasi dalam mikrograf optik.

Kata kunci: serat kenaf, PP, HDPE, ketangguhan impak

ABSTRACT

Composite materials are currently being developed by the automotive industry as car exterior panels, especially on car bumpers due to their light weight and recyclable. There are two types of hybrid composites: i.e., hybrid composites use two types of fibers in a matrix, and two kinds of the matrix with a type of fiber. Research on hybrid composites with two types of fibers has been extensively studied. However, few studies on hybrid composites using two types of matrices. In his work, the hybrid composites of kenaf fiber with two kinds of matrices polypropylene (PP) and high-density polyethylene (HDPE) were fabricated to study the effect of the ratio of PP/HDPE toward the impact toughness of the composites.

Before fabrication, kenaf fibers were treated by immersing the fibers into 6% NaOH solution for 4 hours at room temperature and then chopped to be 6 mm length. The volume fraction of fiber and matrix was 30%: 70% and the ratio of PP/HDPE was varied to be 1:2, 1:1 and 2:1. The hybrid composites were fabricated with hand lay-up technique in a hot compression molding at 165 °C - 180 °C and 1800 psi for 15 minutes. Impact tests on the composite specimens were conducted according to ASTM D 5942. An optical microscope was used to characterize the fiber distribution and the fracture surface.

The results showed that the highest impact toughness 0.028 J/mm² reached by the kenaf/(1PP+2HDPE) hybrid composite. An increase of the volume fraction of HDPE increased the impact toughness of the composite. The fiber distribution in the matrix seemed to be uniform in all composites with almost no voids were found, as confirmed in the optical micrographs.

Keywords: *kenaf fiber, PP, HDPE, impact toughness*