Pengaruh fraksi berat serat daun nanas subang pada sifat tarik dan suhu defleksi komposit polipropilena/serat daun nanas Subang = The influence of weight fractions of Subang pineapple leaf fibers to the tensile properties and deflection temperature of polypropylene Subang pineapple leaf fibers composite

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Abstrak

Komposit ramah lingkungan telah berkembang dalam empat dekade terakhir karena kebutuhan terhadap material ramah lingkungan meningkat. Salah satu komposit ramah lingkungan adalah penggunaan serat alam sebagai penguat pada komposit. Indonesia memiliki berbagai macam serat alam, salah satunya serat daun nanas. Penelitian ini bertujuan untuk mengetahui pengaruh kandungan serat daun nanas, yang berasal dari Subang, pada sifat tarik dan suhu defleksi komposit polipropilena/serat daun nanas Subang. Serat daun nanas diberi perlakuan awal alkalisasi, sedangkan butiran polipropilena sebagai matriks diekstrusi menjadi bentuk lembaran. Metode pembuatan komposit yang digunakan adalah metode Hot Press.
Hasil uji tarik dan uji Heat Deflection Temperature menunjukkan komposit dengan fraksi berat serat daun nanas 30 wt.% adalah yang terbaik. Nilai nilai kuat tarik, modulus elastisitas an suhu defleksi masing-masing sebesar (64,04 ± 3,91) MPa; (3,976 ± 3,91) GPa dan (156,05 ± 1,77) °C, dengan kenaikan masing-masing 187,36%, 198,60%, 264,72% dibandingkan dengan polipropilena murni. Hasil pengamatan pada permukaan patahan menunjukkan moda kegagalan yaitu serat patah dan kegagalan matriks.
<hr>The development of eco-friendly composites has been increasing in the past four decades because the requirement of eco-friendly materials has been increasing. Indonesia has a lot of natural fiber resources and, pineapple leaf fiber is one of those fibers. This experiment aimed to determine the influence of weight fraction of pineapple leaf fibers, that were grown at Subang, to the tensile properties and the deflection temperature of polypropylene/Subang pineapple leaf fibers composites. Pineapple leaf fibers were pretreated by alkalization, while polypropylene pellets, as the matrix, were extruded into sheets. Hot press method was used to fabricate the composites.
The results of the tensile test and Heat Deflection Temperature (HDT) test showed that the composites that contained of 30 wt.% pineapple leaf fiber was the best composite. The values of tensile strength, modulus of elasticity and deflection temperature were (64,04 ± 3,91) MPa; (3,976 ± 3,91) GPa and (156,05 ± 1,77) °C respectively, in which increased 187,36%, 198,60%, 264,72% respectively from the pure polypropylene. The results of the observation on the fracture surfaces showed that the failure modes were fiber breakage and matrix failure.