Pengaruh jumlah nanofiller organoclay dan panjang rantai alkil surfaktan terhadap sifat mekanik bahan bionanokomposit poli (vinil alkohol) organoclay dan selulosa asetat organoclay = The Effect of organoclay nanofiller content and surfactant alkyl chain length to mechanical properties of poly vinyl alcohol organoclay and cellulose acetate organoclay

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Abstrak

Film nanokomposit polimer biodegradable telah dibuat. Clay Tapanuli termodifikasi heksadesiltrimetilamonium bromida (C16) dan oktadesiltrimetilamonium bromida (C18) digunakan sebagai nanofiller. Penelitian ini terdiri atas pemurnian clay, sintesis organoclay dan pembuatan film nanokomposit dengan metode solvent casting. Penelitian ini untuk mempelajari pengaruh jumlah organoclay dan panjang rantai alkil surfaktan terhadap sifat mekanik bahan bionanokomposit. Pergeseran puncak d001 pada difraktogram menunjukkan kenaikan basal spacing sebesar 0,35 nm dan 0,48 nm masingmasing oleh surfaktan C16 dan C18. Difraktogram XRD nanokomposit selulosa asetat dan poli(vinil alkohol) juga menunjukkan adanya struktur dispersi campuran interkalasi dan eksfoliasi.
Hasil ini mendukung hasil uji mekanik film nanokomposit dimana kuat tarik dan modulus elastisitas meningkat. Hasil uji tarik film nanokomposit menunjukkan adanya pengaruh penambahan organoclay dan panjang rantai alkil surfaktan terhadap perubahan nilai kuat tarik, modulus tarikdan regangansaatpatah film nanokomposit dimana peningkatan sifat mekanik nanokomposit selulosa asetat lebih tingi dibandingkan nanokomposit poli(vinilalkohol). Citra FE-SEM film nanokomposit pada permukaan patahan memperlihatkan pori-pori yang tidak teratur dan elastisitas film nanokomposit poli(vinilalkohol) yang lebih panjang dibandingkan film nanokomposit selulosa asetat.
<hr>Nanocomposite films of biodegradable polymers were prepared. The Tapanuly clay modified by heksadecyltrimethylammonium bromide (C16) and Octadecyltrimethylammonium bromide (C18) were used as nanofillers. This experiment were consisted of namely clay purification, organoclay synthesis, and nanocomposite film preparation by a solvent casting methode. The aim of this work was to study the effect of organoclay content and the surfactant alkyl chain length to the mechanical properties of bionanocomposite materials. The shifting of d001 peaks on the difractogram showed that the basal spacing increased by 0.35 nm and 0.48 nm by C16 and C18 surfactants respectively. The XRD difraction also showed the results of cellulose acetate nanocomposite and poly(vinyl alcohol) nanocomposite had a mixed structure of intercalated and exfoliated structure.
These results supported the mechanical testing results of the nanocomposite films that of the tensile strentgh and modulus elasticity was enhanced. The mechanical testing result showed that the organoclay content and surfactant alkyl chain length influenced the tensile strength, modulus elasticity, and strain at break of the nanocomposite films that of the increasing of cellulose acetate nanocomposite mechanical properties was higher than poly(vinyl alcohol) nanocomposite. FESEM images on the fracture surface of the nanocomposite films showed irregular pores on the cellulose acetate nanocomposite films and the longer elasticity of poly(vinyl alcohol) nanocomposite compared to the cellulose acetate nanocomposite films.