

# Perlakuan oksidasi serat ijuk sebagai agen nukleasi polipropilena = Oxidation treatment of ijuk fiber as nucleating agent for polypropylene / Evana Yuanita

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## Abstrak

[Polipropilena (PP) kopolimer impak merupakan salah satu jenis PP yang cukup banyak digunakan. PP kopolimer impak dibuat dengan penambahan etilena yang mengakibatkan penurunan kristalinitas PP. Usaha yang dilakukan untuk memperbaiki sifat kristalinitas PP yaitu dengan menambahkan agen nukleasi. Pada penelitian ini PP ditambahkan agen nukleasi serat ijuk yang mendapatkan perlakuan alkali, dilanjutkan dengan oksidasi menggunakan katalis yang bertujuan untuk mempercepat waktu kristalisasi PP. Serat ijuk ditambahkan sebanyak 10% volum. Morfologi, kandungan kimia dan kristalinitas serat ijuk dikarakterisasi dengan menggunakan FESEM (Field Emission Scanning Electron Microscope), FTIR (Fourier Transmission Infra Red), XRD (X-Ray Diffraction). Terbukti bahwa telah terjadi perubahan diameter dan morfologi serat ijuk menjadi mikrofibril setelah perlakuan alkali yang dilanjutkan dengan oksidasi menggunakan katalis. Hal tersebut menunjukkan telah terjadi penggerusan permukaan serat ijuk yaitu dengan menurunnya kadar lignin dan hemiselulosa yang merupakan pengikat antara lignin dan selulosa. Hasil karakterisasi XRD menunjukkan kristalinitas serat ijuk yang tidak diberi perlakuan adalah 42% sedangkan yang mendapat perlakuan NaOH 2% selama 1 jam dilanjutkan oksidasi menggunakan NaClO 5% selama 5 jam dan katalis KMnO<sub>4</sub> 0,01 N selama 15 menit menunjukkan kristalinitas sebesar 60,75%. Untuk mengerahui efek serat ijuk sebagai agen nukleasi dilakukan uji DSC (Differential Scanning Calorimetry) pada sampel campuran PP-serat ijuk. Hasil DSC menunjukkan ada perubahan kecepatan kristalisasi PP-serat ijuk yang menunjukkan efek serat ijuk sebagai agen nukleasi. Pada kecepatan pendinginan 10 ° C/menit, PP murni memiliki waktu kristalisasi 1,2 detik, PP-serat tanpa perlakuan memiliki waktu kristalisasi 1 detik sedangkan PP-serat ijuk dengan perlakuan NaOH 2% selama 1 jam dilanjutkan oksidasi menggunakan NaClO 5% selama 5 jam dan katalis KMnO<sub>4</sub> 0,01 N selama 15 menit memiliki waktu kristalisasi 0,9 detik.]; Polypropylene (PP) copolymer impact is one type of PP is quite widely used. PP impact copolymer is made by adding ethylene which resulted in a decrease in crystallinity PP. Efforts are being made to improve the properties of PP crystallinity by adding a nucleating agent. In this study PP nucleating agent added "Ijuk" fibers that get alkali treatment, followed by oxidation using a catalyst which aims to accelerate the crystallization of PP time. "Ijuk" fibers was added as much as 10% volume. Morphology, chemistry and crystallinity of "Ijuk" fibers were characterized by using FESEM (Field Emission Scanning Electron Microscope), FTIR (Fourier Transmission Infra Red), XRD (X-Ray Diffraction). It was proved that there has been a change in fiber diameter and morphology of fibers into microfibrils after alkali treatment followed by oxidation using a catalyst. It showed that there has been annihilation of surface fibers with reduced levels of lignin and hemicellulose which is a binder between lignin and cellulose. XRD characterization result indicated the fiber crystallinity untreated fibers was 42% while with treatment 2% NaOH for 1 hour followed oxidation using NaClO 5% for 5 hours and the catalyst KMnO<sub>4</sub> 0.01 N for 15 minutes showed crystallinity of 60.75%. To

determine “Ijuk” fiber as nucleating agents, the sample of PP-fiber mixture was tested by DSC (Differential Scanning Calorimetry). DSC results showed change in rate of crystallization of PP-fiber fibers that indicate the effects of “Ijuk” fiber as a nucleating agent. In the cooling rate of 10 ° C / min, pure PP has a crystallization time of 1.2 seconds, the PPfibers without treatment had a crystallization time of 1 second while the PP-fiber fibers with 2% NaOH treatment for 1 hour followed oxidation using NaClO 5% for 5 hour and 0.01 N KMnO4 catalyst for 15 minutes had a crystallization time of 0.9 seconds., Polypropylene (PP) copolymer impact is one type of PP is quite widely used. PP impact copolymer is made by adding ethylene which resulted in a decrease in crystallinity PP. Efforts are being made to improve the properties of PP crystallinity by adding a nucleating agent. In this study PP nucleating agent added “Ijuk” fibers that get alkali treatment, followed by oxidation using a catalyst which aims to accelerate the crystallization of PP time. “Ijuk” fibers was added as much as 10% volume. Morphology, chemistry and crystallinity of “Ijuk” fibers were characterized by using FESEM (Field Emission Scanning Electron Microscope), FTIR (Fourier Transmission Infra Red), XRD (X-Ray Diffraction). It was proved that there has been a change in fiber diameter and morphology of fibers into microfibrils after alkali treatment followed by oxidation using a catalyst. It showed that there has been annihilation of surface fibers with reduced levels of lignin and hemicellulose which is a binder between lignin and cellulose. XRD characterization result indicated the fiber crystallinity untreated fibers was 42% while with treatment 2% NaOH for 1 hour followed oxidation using NaClO 5% for 5 hours and the catalyst KMnO4 0.01 N for 15 minutes showed crystallinity of 60.75%. To determine “Ijuk” fiber as nucleating agents, the sample of PP-fiber mixture was tested by DSC (Differential Scanning Calorimetry). DSC results showed change in rate of crystallization of PP-fiber fibers that indicate the effects of “Ijuk” fiber as a nucleating agent. In the cooling rate of 10 ° C / min, pure PP has a crystallization time of 1.2 seconds, the PPfibers without treatment had a crystallization time of 1 second while the PP-fiber fibers with 2% NaOH treatment for 1 hour followed oxidation using NaClO 5% for 5 hour and 0.01 N KMnO4 catalyst for 15 minutes had a crystallization time of 0.9 seconds.]