

Pembuatan komposit EIC - selulosa dengan poliuretan untuk isolator kalor = Composite of EIC - cellulose with polyurethane for isolator

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Abstrak

Salah satu penerapan selulosa adalah untuk isolator kalor. Sudah banyak orang melakukan penelitian selulosa untuk isolator, karena merupakan isu populer penghematan energi dengan biaya penanganannya cukup murah. Untuk itu, peneliti membuat selulosa dari alang-alang jenis imperata cylindrica dengan proses ekstraksi. Hasil ekstraksi berupa serat selulosa. Serat selulosa dibuat lembaran dengan menambahkan Na-CMC (Sodium Carboksil Metyl Cellulose) sebesar 3,5%. Pembuatan lembaran dengan cara, serat diblender selama 30 menit, 45 menit dan 60 menit kemudian masing-masing dimasukkan kedalam oven pada suhu 40oC selama 36 jam. Selanjutnya, pembuatan komposit menggunakan cold-press. Pengujian dilakukan terhadap tujuh parameter yakni massa jenis, kapasitas panas, konduktivitas panas, morfologi, TGA, FTIR dan sifat-sifat mekanik yang diuji menggunakan piknometer, DSC Jade Perkin Elmer, Joulemetter, SEM, TGA Linseis STA Patinum Series 1600, FTIR Alpha Bruker, dan UTM Model UCT-5T. Hasil pengujian diperoleh massa jenis minimal 109 kg/m³ dan maksimal 455,5 kg/m³; kapasitas panas minimal 0,304 kJ/kg K dan maksimal 0.945 kJ/kg K; konduktivitas panas minimal 0,074 W/m K dan maksimal 0,153 W/m K; morfologi diperoleh hasil material yang hampir homogen; ketahanan panas minimal 195oC dan maksimal 246oC, hasil dari spektrofotometer terjadi ikatan; kekuatan tarik rata-rata minimal 9,1 MPa dan maksimal 14,2 Mpa; kekuatan tarik spesifik minimal 0,002 MPa/(kg/m³) dan maksimal 0,013 MPa/(kg/m³).

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One application of cellulose is for isolator of heat. Many researche on cellulose for isolator have been conducted due to a popular issue of energy saving with its fairly cheap treatment cost. Cellulose is produced from imperata cylindrica reed by an extraction process. The results of extraction were in a form of cellulose fibers. The cellulose fibers were made to form of sheets by adding 3.5 % Na-CMC (Sodium Carboxyl Methyl Cellulose). The sheets are produced by blending fibers for 30, 45, and 60 minutes and then put it into the oven with temperature of 40oC for 36 hours. Tests were conducted for seven parameters, namely, density, heat capacity, thermal conductivity, morphology, TGA, FTIR and Mechanical properties were evaluated by picnometer, DSC, Joulemetter, SEM, TGA from Linseis STA Patinum Series 1600, FTIR from Alpha Bruker, UCT-5T Model UTM. The test showed : minimal and maximal of densities were 109 kg/m³ and 455.5 kg/m³, respectively; minimal and maximal of heat capacity were 0,304 kJ/kg K and 0.945 kJ/kg K; minimal and maximal of thermal conductivity were 0,074 W/m K and 0,153 W/m K; morphology produce material nearly homogeneous, minimal and maximal of degradation temperature were 195oC and 246oC; result from spectrophotometer was occur a bond; minimal and maximal tensile strength were 9.1 MPa dan 14.2 MPa, respectively; and minimal and maximal specific tensile strength were 0.002 MPa/(kg/m³) and 0.013 MPa/(kg/m³).