CHARACTERIZATION OF OIL PALM EMPTY FRUIT FIBRE REINFORCED PVA

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Field of Study: Polymer composite

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ABSTRACT

Fiber reinforced polymers (FRP) are kinds of composites commonly used for increasing the strength, elasticity and tribological properties of material. The composition of polymers and fibers make it as a unique property and provide solution to the ever growing concerns regarding cost, environment and structural stability of beams and columns.

Development of polymer made life easier and comfortable and introduce new life to human but recycling polymer is today's issue. It is true that polymers are recyclable but process of recycling polymers require greater processing such as heat treating, thermal depolymerization and monomer recycling to be recycle due to high molecular weight of their large polymer chain. Polyethylene and polypropylene plastic products such as bags, film and packaging to degrade totally and harmlessly after use, thereby providing the best environmental solution to the plastic pollution problem, at little or no extra cost. So, Eco-polymers provide managerial, technical, marketing and logistical resources and support necessary to ensure efficient and cost-effective.

For achieving best efficient of mechanical and thermal properties of polymers is reinforcement and additive some material and fibers. Furthermore, this method is cost-effective due to improving and deriving high quality polymer from cheaper ones. The matrix is often reinforced by stronger and stiffer reinforcing fibers such as carbon, glass.

In this project we set to investigate high hardness and factors which effect on mechanical properties, study thermal analysis and some general tests such as chemical resistance, water absorption and void content by using raw data we aim to analyses the process to improve property of polymers.

ABSTRAK

Gentian polimer bertetulang ialah salah satu jenis komposit yang biasa digunakan untuk meningkatkan sifat-sifat kekuatan, kekenyalan dan tribologi bahan. Komposisi daripada polimer dan gentian menjadikan ia sebagai harta yang unik serta memberikan penyelesaian untuk kebimbang yang semakin meningkat bertentang kos, persekitaran dan kestabilan struktur rasuk dan tiang.

Perkembangan polimer menjadikan hidup lebih senang dan lebih selesa serta memperkenalkan hidup yang baru kepada manusia manakala polimer yang boleh berkitar semula yang digunakan oleh manusia kena dikitar semula. Ia adalah benar bahawa polimer boleh dikitar semula tetapi proses untuk kitar semula polimer memerlukan pemprosesan yang lebih kuat seperti rawatan haba, terma penyahpolimeran dan monomer kitar semula untuk dikitar semula disebabkan oleh berat molekul yang tinggi daripada rantai polimernya besar. Polietilena dan polipropilena produk plastik seperti beg, filem dan bungkusan untuk degradasi sepenuh dan tidak berbahaya setelah guna, dengan itu menghasilkan penyelesaian persekitaran yang paling baik untuk pencemaran plastik, dalam sedikit atau kos yang tidak melebihi. Oleh itu, eko-polimer memberikan pengurusan, teknikal, pemasaran dan sumber logistic serta menyokong yang diperlukan untuk memastikan kecekapan dan kos berefektif.

Untuk mencapai kecekapan yang terbaik dalam sifat-sifat mekanik dan terma oleh polimer adalah tetulang dan penambahan beberapa bahan dan gentian. Tambahan pula, kaedah ini adalah kos berefektik disebabkan oleh memperbaik dan memperoleh polimer yang berkualiti tinggi daripada yang lebih murah. Matrik ini sering diperkukuh daripada gentian yang lebih kuat dan lebih keras seperti karbon, kaca dan lain-lain.

Dalam projek ini kami menyiasatkan kekerasan yang tinggi dan faktor-faktor yang akan menjejaskan sifat mekanik, kajian analisis terma dan beberapa ujian umum seperti rintangan kimia, keserapan air dan kandungan lompang dengan menggunakan data mentah, tujuan kami adalah menganalisis proses untuk meningkatkan sifat-sifat polimer.

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LIST OF ABREVIATIONS

ASTM	American Standard for Testing and Materials
Fig	Figure
FESEM	Field-Emission scaning Electron Microscopy
SEM	Scanning electron microscope
MW	Molecular weight
PVA	Polyvinyl alcohol
PVA/EFB	Empty fruit bunch fiber reinforced polyvinyl alcohol
Sdn.Bhd.	Sendirian Berhad
FTIR	Fourier transform infrared spectroscopy
HV	Hardness Vickers
TGA	Thermo gravimetric analysis
DSC	Differential scanning calorimetry
DTG	Differentiate of thermogravimetric

LIST OF SYMBOLS

cm	Centimeter
mm	Milimeter
gr	Gram
Kg	Kilogram
Mpa	Mega pascal
Gpa	Giga pascal
L	length
M	Meter
ml	Mililiter
Min	Minute
Pa	Pascal
V	Volume
Vol %	Volume percentage
W	Weight
w_m	Matrix weight
w_f	Fiber weight
°	Degree
°C	Degree celcius
%	Percentage
Cm^{-1}	Reciprocal centimeter (wave number)
<	Less than
µm	Micrometer

ρ	Density
ρ_f	Density of fiber
ρ_m	Density of matrix
±	Plus minus
T_m	Melting point temperature
T_g	Glass transition temperature