

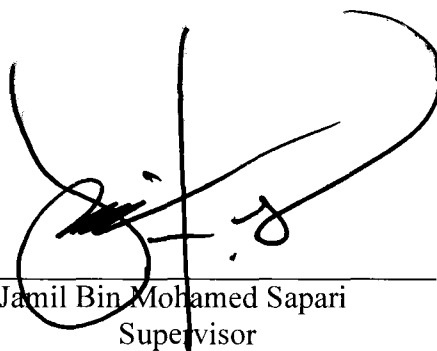
**SYNTHESIS AND CHARACTERISATION OF PALM OIL BASED  
POLYURETHANE COMPOSITE WITH SEA SAND  
AS A FILLER**

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**Final Year Project Report Submitted in  
Partial Fulfilment of the Requirement for the  
Degree of Bachelor of Science (Hons.)  
in the Faculty of Applied Sciences  
Universiti Teknologi MARA**


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This Final Year Project Report entitled “**Synthesis and Characterisation of Palm Oil Based Polyurethane Composite with Sea Sand as a Filler**” was submitted by Nor Fatimah Binti Sameon, in partial fulfillment of the requirements for the Degree of Bachelor of Science (Hons.) Chemistry, in the Faculty of Applied Sciences, and was approved by



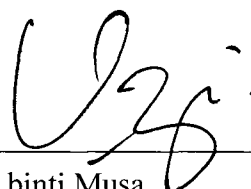
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## ABSTRACT

### **SYNTHESIS AND CHARACTERISATION OF PALM OIL BASED POLYURETANE COMPOSITE WITH SEA SAND AS A FILLER**

Palm oil based polyurethane sea sand composites (PU-SS) was prepared via in situ polymerisation and investigated by using Fourier Transform Infrared (FTIR), Instron Universal Testing Machine Model 5582, Scanning Electron Microscopy (SEM) and Thermal Gravimetric Analysis. Polyurethane (PU) was produced by reacting the Palm Kernel Oil (PKO) with diisocyanate at a ratio of 1:1.15. The addition of the sea sand composites in PU system were at 5, 10 and 15 % by weight of the PU system and mixed by using overhead stirrer. FTIR spectra shows the alteration of the frequency and give confirmation of the PU produced. The formation of PU was confirm by the observation of absorption frequency at  $3337\text{ cm}^{-1}$  that show the presence of the NH group. Meanwhile, the presence of sea sand filler was observed at the peak  $3345\text{ cm}^{-1}$  and  $3365\text{ cm}^{-1}$  which attributed to the OH stretching absorbance of Si-OH while the peak at around  $1100\text{ cm}^{-1}$  is assigned to the Si-O stretching absorbance. Based on the compressive strength result by using Instron Universal Testing Machine Model 5582 shows that the PU-SS 15 % give the highest compressive load reading compare to PU control, PU-SS 5 % and PU-SS 10 %. SEM analysis shows that the PU control has a flat and smooth surface and PU-SS 15 % demonstrated uniform distribution of the composite in the PU system. Based on TGA results it shows that PU-SS 15% have higher decomposition temperature compared to PU control respectively.