

**UNIVERSITI TEKNOLOGI MARA**

**EFFECT OF PALM KERNEL SHELL (PKS)  
POWDER ON CURE CHARACTERISTICS,  
PHYSICAL AND MECHANICAL  
PROPERTIES OF ACRYLONITRILE  
RUBBER (NBR) COMPOSITES**

**NOR ADABIAH BINTI MD NAYAN**

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## **AUTHOR'S DECLARATION**

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

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Name of Student : Nor Adabiah bt Md Nayan

Student I.D. No. : 2016351627

Programme : Bachelor of Science (Hons.) Polymer Technology -  
AS243

Faculty : Applied Sciences

Thesis Title : Effect of Palm Kernel Shell (PKS) Powder on Cure  
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Signature of Student : .....

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## **ABSTRACT**

### **EFFECT OF PALM KERNEL SHELL (PKS) POWDER ON CURE CHARACTERISTICS, PHYSICAL AND MECHANICAL PROPERTIES OF ACRYLONITRILE RUBBER (NBR) COMPOSITES**

In this research, Palm Kernel Shell (PKS) was used in NBR composite to evaluate the strength of PKS as potential filler in the NBR composites. However, there some problem due to the polarity of the filler and the rubber matrix that was effect the physical and mechanical properties of the PKS filled NBR composites. The effect of palm kernel shell (PKS) powder on cure characteristics, physical and mechanical properties of acrylonitrile rubber (NBR) composites was successfully investigated. Palm kernel shell filled Nitrile Rubber by the different formulation (0 phr, 5 phr, 10 phr, 15 phr and 20 phr) were compound br two roll mill machine. Cure characterization was done by Moving Die Rheometer. By testing the cure characterization of the filler, scorch time and cure time can be obtained. The tensile strength, elongation at break and crosslink density shows decrement trend while the Young's modulus and hardness demonstrates increment trend as filler loading increase. Tensile strength was decrease as the filler loading increase is due to poor adhesion between the filler and rubber matrix. while elongation at break was reduce due to effect of stiffening and hardening. From this research, 10 phr of PKS powder was concluded as optimum loading. As it shows the highest tensile strength compared to other loading.