DEVULCANIZATION OF ETHYLENE PROPYLENE DIENE MONOMER(EPDM) WASTE USING PALM OIL AS A DEVULCANIZATION AGENT

MUHAMMAD ALIFF IMRAN BIN MD NIZAM

BACHELOR OF SCIENCE (Hons). APPLIED CHEMISTRY
FACULTY OF APPLIED SCIENCES
UNIVERSITI TEKNOLOGI MARA

AUGUST 2023

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

AUGUST 2023

This Final Year Project Report entitled **"Devulcanization of Ethylene Propylene Diene Monomer (Epdm) Waste Using Palm Oil as A Devulcanization Agent"** was submitted by Dalina Samsudin in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Polymer Technology, in the Faculty of Applied Sciences, and was approved by

Dr. Dalina Samsudin
Supervisor
B. Sc. (Hons.) Polymer Technology
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

Dr. SitiNurlia binti Ali
Project Coordinator
B. Sc. (Hons.) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

Dr. Nur Nasulhah binti Kasim
Head of Programme
B. Sc. (Hons.) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

Date: 4 August 2023

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ABSTRACT

DEVULCANIZATION OF ETHYLENE PROPYLENE DIENE MONOMER(EPDM) WASTE USING PALM OIL AS A DEVULCANIZATION AGENT

This research aims to investigate the effectiveness of palm oil extract (PO) as a devulcanization agent for ethylene propylene diene rubber (EPDM) waste. The EPDM wastes were vulcanized using a two-roll mill, which is used to put shear on the rubber structure. The mechanical properties of the EPDM rubber, including elasticity and elongation, can be improved by main chain swelling during thermomechanical processes. The effects of different ratios of EPDM rubber to palm oil of 1:1, 1:2, 2:1 and 1:3 on the mechano-chemical process of EPDM was investigated. The results show that the ratio of 1:3 which was the higher volume of palm oil as devulcanizing agent affected greatly on the mechanical characteristics of the recycled rubber were significantly influenced by the cross-linking procedure. FTIR analysis shows that the main chain of the rubber can be devulcanized by a pure palm oil as a devulcanizing agent. The results of this study indicate that pal oil has the potential to replace chemical based oils as viable processing aids in the rubber sector. The combined technique called mechano-chemical can help to improve the devulcanization for recycling waste with a more environmentally friendly devulcanizing agent aligns with Malaysia's aspiration towards shared prosperity vision 2030.