

ADVANCES IN MATERIALS ENGINEERING

Volume 1

Edited By:
Zahurin Halim
Iskandar Idris Yaacob
Md Abdul Maleque



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Comparison of Mechanical Properties between Untreated and Sulphuric Acid Treated Short Carbon Fiber Reinforced Thermoplastic Natural Rubber (TPNR) Composite

Noor Azlina Hassan¹, Norita Hassan², Sahrim Hj. Ahmad³ and Rozaidi Rasid⁴

¹. Faculty of Engineering – International Islamic University Malaysia

^{2,3,4}. Fakulti Sains dan Teknologi, Universiti Kebangsaan Malaysia

✉ : noorazlina_hassan@iium.edu.my

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Abstract. Reinforced short carbon fiber with untreated and treated sulphuric acid thermoplastic natural rubber (TPNR) composite was prepared via melt blending method using Thermo Haake (internal mixer). The aim of the study was to make the comparison on its mechanical properties. The mechanical properties were studied at various fibers loading 5, 10, 15, 20 vol%. The results showed that mechanical properties of TPNR composite with treated carbon fibers were increased compared to the untreated carbon fibers. Observation from scanning electron microscopy (SEM) micrograph showed the treated carbon fibers improved the adhesion of TPNR matrix and fibers.

Introduction

Properties of composites materials critically depend on the matrix, the reinforcement and also the interaction between the matrix and the reinforcement. Short carbon fiber has long been used as reinforcement where it offer high strength, stiffness, lower weight, outstanding fatigue characteristic, chemical inertness, do not suffer from stress corrosion or stress rupture failure [7].

Oxidative surface treatment of carbon fibers will add the functional groups to the carbon fibers and it will contribute to the stiffness at the surface areas [9]. Functional groups such as COOH may contribute to the highest adhesion to the carbon surface [10]. The effectiveness of this adhesion through the functional groups was increased by the increasing of the oxygen atoms. Studies have shown that surface treatment is able to increase the roughness of carbon fiber and promotes better fiber matrix bonding [9].