UNIVERSITI TEKNOLOGI MARA

EFFECT OF CHEMICAL FOAMING AGENTS ON MECHANICAL PROPERTIES OF PP/WOOD FIBER COMPOSITES

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ABSTRACT

The objective of our research was to compare the effect of variations mass of foaming agents on the density of PP/wood composites. Composites of pp/wood is prepared with internal mixer with addition different value of sodium bicarbonate for each sample. After the sample grounded, several tests are undergone for example, surface imaging by using optical microscope and tensile. The mechanical properties of the composites decreased with addition of chemical foaming agents, $NaHCO^3$. The results also revealed that the content of chemical foaming agents, NaHCO3 are strong function to the properties of WPC composites, as well as the foaming conditions.

Keywords:

A. Foams

A. Polymer–matrix composites (PMCs)

A. Wood

B. Mechanical properties

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CHAPTER ONE: INTRODUCTION

1.1 Research Background

Generally, wood-based polymer composites are higher grade compare to neat polymers in terms of material costs and stiffness. This is the cause the increasing demands of wood-filled thermoplastics by the plastic industries (Countinho et al. 1999). Among of all the property of polymer composites, low weight is the most essential part that is taking account in the application of polymer composites on construction, automotive industry, etc. PP/wood flour composites were expanded by applying various chemical foaming agents (Franciella et al. 2013).

Lignocellulosic materials been identified was utilized as fillers in various polymer composites for economic and environmental causes. Among these causes, the availability of under cost raw materials, their biodegradability and recyclability must be noted. Increased and improvement of mechanical and thermal insulating properties of bio-components content allows by the integration of natural fibres in polymer formulations (Kuranska et al. 2012). Density is a major property in to be implemented such as the automotive industry and civil construction. Hence, numerous efforts have been taken to innovate a new polymer composites that can be lighter and stronger. Through various important automotive use, polymer foams are being applied to substitute traditional polymer bulk components for weight reduction (Zini et al. 2011). In addition, plant fibers embedded in a resin which is part of foamed biocomposites have been identified to contain high energy dissipation characteristics, quite promising for impact safety implementations (A.Argento et al. 2011). Polypropylene (PP) foams have been found as interesting replacement for other polymer foams in industrial applications since PP shows advantageous rigidity, advantageous strength and improved impact strength compare to other polyolefins (Naguib et al. 2002, Yu et al. 2011).

Polymer foams are needed by the activity of foaming agents, which can produce unfilled cells in the matrix (D. Klempner et al. 1991). Physical foaming additives give development by encountering changes in their physical state (J.R. Robledo-Ortiz et al. 2008). These may incorporate volatilization of a liquid or escape of a compacted gas after its joining into a polymer under strain. Chemical foaming agents are typically strong that create a gas (or a mix of gasses)