A REVIEW ON EFFECT OF CHEMICAL REFINEMENTS ON NATURAL FIBER COMPOSITE PROPERTIES

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ABSTRACT

EFFECT OF CHEMICAL REFINEMENT ON NATURAL FIBER COMPOSITE PROPERTIES

Chemical refinement is important for natural fiber composite because it can enhance the interfacial adhesion between natural fiber and polymer matrix which strengthen the bond of polymer matrix with natural fiber. This study reviewed various chemical refinements used to reinforce the natural fiber with polymer matrix and their effect on natural fiber composite properties. Based on the finding in this review, there are various types of chemical refinement used on natural fiber such as alkaline treatment, silane treatment, acetylation treatment, benzoylation treatment, peroxide treatment, maleated coupling treatment, sodium carbonate treatment, acrylation and acrylonitrile grafting treatment, stearic acid treatment, permanganate treatment, and sodium bicarbonate treatment. Natural fiber composite properties such as tensile strength, flexural strength, water absorption, interfacial shear strength, and impact strength can be improved with the chemical refinement techniques listed in this review.

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CHAPTER 1

INTRODUCTION

1.1 Background of study

Natural fiber composites are composite materials produced by a matrix with a reinforcement of natural fiber. Natural fiber can be classified into three groups which are plant-based fiber, animal-based fiber, and mineral-based fiber. Natural fiber is most preferable to be used as a reinforcement fiber in the fiber composites industries compared to carbon and glass fiber because of its low cost, low density, and biodegradability properties (Dasore et al., 2021). Mostly, the matrix used in the manufacturing of natural fiber composite is a polymer matrix such as resin. The function of the matrix is to hold the natural fiber together inside the polymer matrix. The matrix for natural fiber composites can be divided into two types which are completely degradable and slightly degradable. Natural-based and oil-based are completely degradable matrices while petrochemical-based resins such as thermoset and thermoplastic are known as slightly degradable matrices (Dasore et al., 2021).

Natural fiber composites have two major issues which are the hydrophilic nature of the fiber and the hydrophobic nature of the matrix (Stevens et al., 2022). Bonding at the contact is diminished due to the underlying mismatch between these two phases. Chemical treatments on fiber may