SIMPLE CHARACTERIZATION BY THE INFLUENCE OF DAMMAR IN POLYURETHANE AS A COATING RESIN

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ABSTRACT

In this project, the dammar is used to modified and improve the properties of polyurethane (PU) as a coating resin. The dammar was varied from10wt% to 50wt% to optimize the composition. After the sample was cured, this sample was been testing to find the best composition in which good adhesion, higher contact angle and resistivity. The adhesion was measured using cross hatch test (ASTM D3359), result found that PU-10wt% of dammar showed the best adhesion compared to others. Electrochemical impedance spectroscopy (EIS) is a corrosion tool to measured resistivity. After the sample was undergone this characterization, it was found that PU-10wt% of dammar showed the higher resistivity, which is $4.98\times10^{6}\Omega$. While other compositions, in a range of $1.0\times10^{4}\Omega$ until $1.0\times10^{6}\Omega$. Wettability was measured using contact angle instrument. The biggest angle shown by PU-20wt% of dammar (66.19°) followed by PU-10wt% of dammar (64.31°), both are almost reach 90° of angle. This value can categorize the PU-20wt% of dammar and PU-10wt% of dammar as water resistance coating. Overall, thePU with 10wt% of dammar showed the best composition with good adhesion, resistivity and wettability. This means 10wt% of dammar can modify the PU to be a good performance resin.

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CHAPTER 1

INTRODUCTION

1.0 Background

Nowadays, coating was widely used to protect steel structures include an epoxy primer, an epoxy intermediate and a polyurethane topcoat. In many cases the application topcoat after long exposure, have effects that the coating such as epoxy coating loss of adhesion, and thus in a short time after application debonding may occurs.

Mainly, coatings are used for decorative purposes, protection, or function, but in most cases it is the result of this combination. The term "functional coating" systems are explained, as classical lamination properties (the decoration and protection) with additional functions (M.Wulf *et al.,* 2002). The functions may be different and depends on the actual application of coated substrates. Typical examples of the coating which functions as a self-cleaning (E. Nun *et al.,* 2002), is easy to clean (anti-graffiti) (M.Khur *et al.,* 2003), antifouling (M.Perez *et al.,* 2003), feel soft and antibacterial (K.Lewis *et al.,* 2001). Various mechanisms and applications are involved to meet the demands of some users.

Dammar resin is a resin plant, which grows and can be found easily in the tropical forests of Malaysia. This plant is known as the bloody *Dipterocaupocea sp.* trees and used in ancient times as a varnish (Perera *et al.,* 1996). Previously, researches have been done on mixing of dammar