

## Accepted Manuscript

An experimental investigation of the effects of nanoparticles on the mechanical properties of epoxy coating

M. Boumaza, R Khan, S Zahrani

PII: S0040-6090(16)30556-9  
DOI: doi: [10.1016/j.tsf.2016.09.035](https://doi.org/10.1016/j.tsf.2016.09.035)  
Reference: TSF 35497

To appear in: *Thin Solid Films*

Received date: 4 March 2016  
Revised date: 30 July 2016  
Accepted date: 6 September 2016



Please cite this article as: M. Boumaza, R. Khan, S. Zahrani, An experimental investigation of the effects of nanoparticles on the mechanical properties of epoxy coating, *Thin Solid Films* (2016), doi: [10.1016/j.tsf.2016.09.035](https://doi.org/10.1016/j.tsf.2016.09.035)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## An experimental investigation of the effects of nanoparticles on the mechanical properties of epoxy coating

M.Boumaza<sup>1\*</sup>, R Khan<sup>1</sup>, S Zahrani<sup>1</sup>

<sup>1</sup>Dept of Chemical Engineering, King Saud University, PO Box 800, Riyadh 11421, Saudi Arabia

\*Corresponding author

muradbza@gmail.com, rawaiz\_khan86@yahoo.com, szahrani@ksu.edu.sa

### Abstract

Epoxy resin is one of the most common polymer matrixes due to its wide range of applications in various industries such as adhesives, coatings, composite materials and construction. In the current study epoxy has been considered for improving its properties using reinforcing Nano fillers. The incorporation of relatively low percentages of nanoparticles in epoxy coating system, bring dramatic improvements in mechanical properties, thermal stability and adhesion of epoxy resin.

The main focus of the study is to investigate the effect of inorganic nanoparticles on mechanical and morphological properties of epoxy/Polyamid coating system, and compare the obtained results with that of unreinforced coating. The nanocomposite coatings are formulated by incorporation of various types of nanoparticles ( $ZrO_2$ ,  $ZnO$ ,  $SiO_2$ , and  $Fe_2O_3$ ) with 2 wt. % loading for each type of nanostructure. The results revealed that the incorporation of such a small amount of these nanoparticles brings significant changes to mechanical properties, with  $SiO_2$  demonstrated superior mechanical properties. The hardness and elastic modulus increased 71% and 26 % respectively by addition of 2 wt. %  $SiO_2$  in epoxy matrix.

Keywords: Epoxy coating, mechanical properties, nanoparticles, and hardness, elastic Modulus.

Download English Version:

<https://daneshyari.com/en/article/5466459>

Download Persian Version:

<https://daneshyari.com/article/5466459>

[Daneshyari.com](https://daneshyari.com)