

Accepted Manuscript

Tunable morphology and hydrophilicity to epoxy resin from copper oxide nanoparticles

Anu Tresa Sunny, Miran Mozetic, Gregor Primc, Suresh Mathew, Sabu Thomas



PII: S0266-3538(16)30948-4

DOI: [10.1016/j.compscitech.2017.04.010](https://doi.org/10.1016/j.compscitech.2017.04.010)

Reference: CSTE 6740

To appear in: *Composites Science and Technology*

Received Date: 15 August 2016

Revised Date: 2 April 2017

Accepted Date: 8 April 2017

Please cite this article as: Sunny AT, Mozetic M, Primc G, Mathew S, Thomas S, Tunable morphology and hydrophilicity to epoxy resin from copper oxide nanoparticles, *Composites Science and Technology* (2017), doi: 10.1016/j.compscitech.2017.04.010.

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.

Tunable morphology and hydrophilicity to epoxy resin from copper oxide nanoparticles

Anu Tresa Sunny^a, Miran Mozetic^b, Gregor Primc^b, Suresh Mathew^{a, c} and Sabu

Thomas^{*a,d}.

^a School of Chemical Sciences, Mahatma Gandhi University, Kottayam- 686560, Kerala, India.

^bDepartment of Surface Engineering, Jozef Stefan Institute, Ljubljana, Slovenia

^cAdvanced Molecular Materials Research Centre, Mahatma Gandhi University, Priyadarshini Hills, Kottayam-686560, Kerala, India.

^dInternational and Inter University Centre for Nanoscience and Nanotechnology, Mahatma Gandhi University, Priyadarshini Hills, Kottayam-686560, Kerala, India.

*Corresponding author Prof. Sabu Thomas, E mail: sabupolymer@yahoo.co.in, sabuchathukulam@yahoo.co.uk.

Abstract

Nanosized copper (I) oxide particles (nCOP) synthesized through chemical reduction reaction was employed to formulate an epoxy based novel nanocomposite material. Wetting characteristics of the nanocomposites were studied through contact angle measurements as a function of filler content. The contact angle of epoxy with water decreased from 79° to 35° when the filler content is varied from 0 to 10 phr indicating an upsurge in the hydrophilicity of the material. When the nCOP content is increased from 0-10phr, the surface free energy and work of adhesion endured a hike around 50% by magnitude, interfacial free energy suffered a decrease by half of its initial value, spreading coefficient became more positive while Girifalco-Good's interaction parameter changed by around 10%. The improvement in hydrophilicity of nanocomposite was attributed to the enrichment of the polymer surface with nanoparticles. The contact angle values of the

Download English Version:

<https://daneshyari.com/en/article/5022092>

Download Persian Version:

<https://daneshyari.com/article/5022092>

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