MULTIFUNCTIONAL EPOXY- COPPER OXIDE NANOCOMPOSITES

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ABSTRACT

Nanosized Copper (I) Oxide particles (nCOP) were prepared through the chemical reduction of bivalent copper ion in aqueous medium using hydrazine hydrate as the reducing agent. The X-ray diffraction patterns and electron microscopic images of nCOP confirmed the formation of ultra fine, phase pure, cubic particles with cuprite structure. These nCOP were used to reinforce diglycidyl ether of bisphenol A (DGEBA) based epoxy resin to develop a multifunctional novel nanocomposite. TEM analysis of nanocomposites showed the achievement of fine and homogeneous dispersion of nCOP throughout epoxy matrix along with the conservation of its cubic morphology. SEM investigation on the fracture surfaces of the nanocomposites also provided substantial evidence for the strong interfacial adhesion of nCOP with the epoxy matrix. The influence of nCOP as a filler on the various properties of epoxy resin at different filler loading were investigated. Noticeable changes were observed in the various properties of epoxy resin in presence of different nCOP contents. Finally, a relationship between well dispersed morphology of nCOP domains in the epoxy matrix with the observed changes in properties of epoxy resin was established.

Acknowledgement: The financial support from the NSTI scheme of the Department of Science & Technology, Government of India is for this work is gratefully acknowledged. One of the authors (Ms. Anu Tresa Sunny) is thankful to CSIR, Govt. of India for providing Senior Research Fellowship.