Journal of Basic and Applied Engineering Research
p-ISSN: 2350-0077; e-ISSN: 2350-0255; Volume 3, Issue 7; April-June, 2016, pp. 609-609

http://www.krishisanskriti.org/Publication.html

Structural and Mechanical Properties of Thiokol Rubber with Variation in NiO Nanoparticle Filler Loading Percentage

Tarun Kataria[1], Jay Singh[2] and D. Kumar[3]

[1,2,3]Department of Applied Chemistry & Polymer Technology, Delhi Technological University, Shahbad Daulatpur, Main Bawana Road, Delhi 110042, India
E-mail: [1]tar.kat@rediffmail.com

Abstract—*This wok reports the increase in the yield of Thiokol rubber and enhancement of its rubbery properties by incorporation of nickel oxide (NiO) nanoparticles onto reaction polymerization. The NiO nanoparticles were prepared by sol-gel technique and the thiokol rubber was prepared by condensation polymerization. The crystalline size, surface morphology, functional groups, average particle size and thermal stability of NiO, pure thiokol rubber and polymer nanocomposite were studied via XRD, SEM, FTIR, TEM and TGA techniques. The NiO nanoparticles prepared were ultrasonicated with NaOH solution before polymerization to thoroughly distribute the nanoparticle in the rubber, and then dichloroethane was added for the generation of monomers and polymerization to take place. An optimum yield of 130% was obtained when certain amount of nanoparticles were added. A parabolic graph of yield vs. reactants has been obtained which gives the appropriate amount of nanoparticles to be added to obtain optimum yield and better rubber properties like increase in abrasion resistance, decrease in hardness, increase in impact resistance increase in strength, decrease in water and oil absorption, etc. Addition of nanoparticles also decreased the rate of burning as well as introduced self-extinguishing property. The composite showed darker color with air pores leading to an increase in acquired volume. The results demonstrate a viable strategy toward the preparation of polymer functionalized metal oxide nanoparticles that may be useful for construction of functional polymer nanocomposites.*

Keywords*: NiO nanoparticles, Thiokol rubber, Abrasion resistance, Hydrazine*