# SYNTHESIS, CHARACTERIZATION AND THERMAL CONDUCTIVITY OF DIGLYCIDYL MONOMER BEARING THIOUREA ANDSALICYLADEHYDE GROUP EPOXY RESIN

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## ABSTRACT

**Noveldiglycidyl monomers bearing phenylthiourea and azomethine groups were prepared using 4,4'-diaminodiphenyl ether and 4,4'-diaminodiphenylsulphone as reactants. The monomers were characterized byFTIR and $^1$H-NMR spectroscopic methods. The monomers were blended with epoxy based trickle impregnation resinandcured.Thecuredresinsweresubjected toThermaogravimetricanalysis and Differential scanning colorimetry analysisinpresence of 3% by weight of the diglycidyl monomers bearing thiourea and azomethine groups in the cured blends did not alter the thermal stability but increased the thermal conductivity. The thermal conductivity of the cured blends was approximately 2.1 times higher than that of epoxy-based trickle impregnation resin.**

**Keywords: Diglycidyl monomers; Phenylthiourea; Thermal conductivity, Spectral analysis, TEM.**

## INTRODUCTION

Epoxy resins are low molecular weight pre-polymers or higher molecular weight polymers which normally contain at least two epoxide groups. The epoxide group is also sometimes referred to as a glycidyl or oxirane group. Epoxy resins are polymeric or semi-polymeric materials, and as such rarely exist as pure substances, since variable chain length results from the polymerisation reaction used to produce them. · High purity grades can be produced for certain applications, e.g. using a distillation purification process. One downside of high purity liquid grades is their tendency to form crystalline solids due to their highly regular structure, which require melting to enable processing. Epoxy resins are fundamentallyprepolymers that have on an average two or more epoxide groups per molecule[1].Formulations of epoxy resin play significant role in the electronics industry and are employed in transformers, transistors, generators, integrated circuits,andmotors. These resins are very good electrical insulators and protect electrical com- ponents from moisture,dust and short circuiting. Both elec- trical and electronic equipment have newly been improved in size and performance with designs to diffuse the heat from internal components efficiently.

Electronic and electrical equipment should be insulated with materials that have higher thermal conductivities usually thermoset composites containinginorganic ceramic powders having elevated thermal conductivity are used. Silicon Carbide, Aluminum oxide and magnesium oxide particles are some of the inorganic fillers used for the development of thermal conductivity of polymers[2]. The fillerspresently in use for epoxy molding compositions consist of fused silica, alumina, fiber glass, calciumsilicate and clays..

The use of inorganic ceramics improves thethermal conductivity of the resin to a little extent, they posetroubles in