

MDA 경화제가 DGEBA/MDA/SN 계의 전기트리 열화현상에 미치는 영향

(Effects of MDA Curing Agent on Electrical Treeing Deterioration Phenomena
of DGEBA/MDA/SN System)

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The molded epoxy resin systems are useful to realize high capacity, small size, light weight, and combined high electric power equipment. The conventional cured-epoxy resin system DGEBA(diglycidyl ether of bisphenol A)/MDA(4,4'-methylene dianiline) was weak to impact stress because of its high cross-linking density. To modify this weakness, chain extending reactive additives of nitriles were added and the improved test results have been reported.

For its uses of high voltage electrical insulators, there should be no impurities or freed volume. Because, the combined electrical, mechanical, thermal and environmental stresses are concentrated on it and dielectric breakdown is accelerated by the formation of pre-dielectric breakdown phenomena known as electrical tree. Impurities such as conducting metallic particles, dusts, reactant residues, and so on can affect the service life of electric equipment insulated with epoxy resin system. In this study, the effects of curing agent on dielectric breakdown characteristics were investigated.

Epoxy resin system of DGEBA, MDA and SN(succinonitrile) were used as epoxy matrix resin, curing agent and reactive additive. The equilibrium amount of MDA to DGEBA is 26 phr. 22, 26 and 30 phr of MDA was mixed with DGEBA/SN(15 phr), respectively. The mixtures were molded at 80°C for 1.5 hr and then 150°C for 1.0 hr, respectively. Needle electrode of 3 μm of tip radius was molded with the systems. Dielectric breakdown voltage was measured at the voltage raising rate of 500 V/sec in silicon oil. The electrical treeing propagation and dielectric breakdown phenomena were observed under the specific applying voltage.

References

1. T. Tanaka, "V. Electrical insulating material", *T. IEE Japan*, **110-A**, 44(1990).
2. Y.S. Cho, S.H. Lee, H.K. Lee, M.J. Shim, J.S. Lee and S.W. Kim, "Dielectric breakdown characteristics in DGEBA/MDA/SN/HQ system", *Proc. of 1st Int. Conf. on HNTTI'96*, Dandong, China, 755(1996).