URN etd-0407109-183706-438
Author Chang-I Guo
Author's Email Address No Public.
Statistics This thesis had been viewed 66 times. Download 166 times.
Department
Year 2005
Semester 1
Degree Master
Type of Document Master's Thesis
Language zh-TW.Big5 Chinese
Title Study of the morphology and properties of rubber modified high transparent epoxy composite
Date of Defense 0000-00-00
Page Count 71
Keyword
epoxy
anhydride
liquid rubber modifier
transparency

Abstract
In this study, we adopt aliphatic cyclic epoxy (methyl-3, 4-epoxycyclohexyl-carboxylate, 4221), matching with a curing agent of anhydride (4-methylhexahydrophthalic anhydride, MHHPA), and a catalyst of tertiary amine (1-cyanoethyl-2-undecylimidazole, C11Z-CN), to cure.
We discovered that as the curing agent increases, the weight loss during curing increases. Besides, the content of curing agent affects the color of the cured product greatly. When the A / E ratio (anhydride / epoxy) reaches 0.9:1, the cured product is water clear and its Tg is the highest among all compositions. We also found that, when the content of catalyst increases, it improves reaction speed, and suppresses the weight loss, but the Tg of the cured product decreases.
In order to improve the mechanical properties of the epoxy resin (Tg, storage modulus, etc.), a liquid rubber (carboxyl-terminated butadiene-acrylonitrile, CTBN) was added. When we blended the rubber directly, the transparency and Tg of cured product decreases with the increases of rubber content. When the acrylonitrile content of rubber is low, its polarity is low, which affected compatibility between the rubber and epoxy resin, and the cured product becomes opaque. In order to improve the compatibility, we used different reaction conditions (for instance, change reaction temperature and time, etc.), to let epoxy resin and rubber reacted in advance. With the improvement of compatibility, the transparency of cured product is greatly improved with the additional benefit of higher Tg. Besides, the downward trend of modulus is more apparent. We also changed the curing kinetic by varying the content of catalyst while curing. An interesting phenomenon is observed that fast epoxy curing reaction results in a very different morphology of the cured product. The corresponding mechanical properties are also varied.
Advisory Committee Yeong-Tsyr Hwang - advisor

Files etd-0407109-183706-438-002.pdf
etd-0407109-183706-438-001.pdf
etd-0407109-183706-438-003.pdf

indicate access worldwide
Date of Submission 2006-08-23