Sym. G : Electro-packaging

POLYMERIC MATERIALS- I

E-THU-15

FLIP CHIP UNDERFILL EPOXY WITH JEDEC LEVEL 2 PERFORMANCE, MARK BONNEAU (ABLESTIK, Rancho Dominguez, CA USA)

In many existing applications of flip chip on board, JEDEC level 3 anti-popcorn performance is not mandated. The implementation of flip chip technology in such packages as BGA has changed the requirements due to the need to attach the package later. JEDEC level 3 (30oC/60% RH) reflow performance is a minimum requirement. No delamination at level 2 (85oC/60% RH) has become the desired comfort level. Most commercial flip chip underfill materials will pass JEDEC level 3 conditioning, but almost all fail when exposed at the level 2 condition. This paper will discuss the development of a material capable of JEDEC level 2 performance. Material characteristics such as underfill flow, cure speed, adhesion and physical properties and JEDEC 2 anti-popcorn testing data will be presented.

THURSDAY

E-THU-16

EFFECT OF THE ELASTIC MODULUS OF POLYMER POWDER ON THE ELECTRICAL PROPERTIES OF ANISOTROPIC CONDUCTIVE FILM FOR LCD PACKAGING APPLICATIONS, **TAE S. KIM**, H. S. MOON, D. H. LEE, D. Y. CHOI, J. S. HWANG, J. H. PARK, S. K. MOON, and P. S. AN (LG Cable Research Institute, 555 Hogye, Anyang, Kyunggi, 431-080, Korea)

To investigate the bounce-up problem in the contact resistance of the anisotropic conductive film (ACF), the electrical and mechanical properties of the ACF were studied as a function of the curing kinetics of the adhesive epoxy resin and the elastic modulus of the polymer powder. The elastic modulus of the polymer powder, which is a core material of the conductive particle in the ACF, was controlled by changing the feed ratio of the styrene and divinylbenzene during the dispersion co-polymerization of the two monomers. An in-situ measurement of contact resistance of the ACF during bonding was performed to observe the change of the electrical properties of the ACF as the curing of the adhesive epoxy resin proceeds. The thermo-mechanical properties of the polymer powders were measured via glass transition temperature measurement and the micro-compression test. The bounce-up effect of the ACF decreased markedly as the elastic modulus of the polymer powder was reduced. It was found that there exists an optimum elastic modulus of the polymer powder as a core.

E-THU-17

A STUDY ON ADVANCED COMPOSITE MATERIAL FOR ELECTRONIC PACKAGING AND SATELLITE, HO SUNG LEE, KYUNG JU MIN (KARI, Taejon, 305-333, Korea), K. W. JANG and S. T. JUNG (Han Kuk Fiber Glass Co., Kyungnam 628-850)

The objective of this study is to develop composite material as viable weight-saving substitute for the traditional methods of thermal control for electronic packaging and spacecraft applications, The material was designed and evaluated as thermal control face sheets for heat pipe panel of Mugunghwa communication satellite. The panel and face material must effectively transport localized high thermal flux from high power electronics to other lower temperature locations. It was shown that incorporation of high-modulus pitch fiber into polymer matrix successfully produced high thermal conductivity, high specific strength, lightweight composite that could be used as heat sinks for high density packages. The physical and mechanical properties of the material were characterized and it showed a thermal conductivity which is higher than aluminum alloys. The CTE was measured in three dimensions and the thermal conductivity of composites was compared with various models. The thermal cycling test for space environment endurance was performed and the results were analyzed.

E-THU-18

MEASUREMENT OF ADHESION STRENGTH BETWEEN CU-BASED LEADFRAME AND EPOXY MOLDING COMPOUND UNDER MIXED MODE LOADING, H. Y. LEE and **JIN YU**(Dept. of Mat. Sci. and Eng., KAIST, Taejon, 305-701, Korea)

Initial delamination of leadframe(die pad)/EMC interface due to the incomplete molding process frequently causes the popcorn cracking of thin plastic packages during the solder reflow process. To lower the generation frequency of popcorn crack, strong adhesion strength of leadframe/EMC interface is required. In this study, two kinds of copper oxide films were formed on the Cu-based leadframe surface by immersion of precleaned Cu-based leadframe into hot alkaline solutions. After oxidized leadframes were molded in EMC, adhesion strength between leadframe and EMC was measured by the pull-out test, sandwiched double cantilever beam(SDCB) test and sandwiched Brazil-nut(SBN) test. In addition, fracture path was determined through SEM, XRD, AES and XPS analyses of fractured surfaces. Results showed that two copper oxides enhanced the adhesion strength and oxide thickness was closely related to the adhesion strength. Fracture paths were varied with oxide thickness and composition.

Cracks along the interface between dissimilar materials, to some extent, can propagate along the interface under mixed mode loading. So the adhesion strength between dissimilar materials should be measured as a function of mode mixity.