In-situ Moisture Desorption Characterization of Epoxy Mold Compound

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Abstract

Moisture desorption characteristics of an epoxy mold compound (EMC) at 100°C, 120°C, 140°C, 160°C, 180°C, 200°C, 220°C, 240°C, and 260°C, respectively, is studied in this paper. A high resolution moisture analyzer is used to measure *in-situ* moisture weight loss as a function of time at different temperatures. The specimens are preconditioned (e.g. 85°C /85%RH) before they are placed in the analyzer for desorption process. The material can be heated to the desired temperature in a contained septum bottle that connects to a dry air flow system and a moisture sensor. The moisture sensor detects water in the gas stream to generate an accurate measurement of the mo

In this paper, a high resolution moisture analyzer, Computrac Vapro Pro Moisture Analyzer, is used to measure *in-situ* moisture loss as a function of time at a

concentration ( ). The moisture content due to non-Fickian diffusion is expected to be nonreversible since it forms as bound water in material.

3) From desorption curve, the ‘permanent’ residual moisture content can be obtained from experiment. It is well aligned with as $C_{sat.2}$, predicted and obtained by the dual stage model in absorption. This demonstrates the validity of the dual stage model applicability.
4) Fickian diffusivity at desorption by fitting the experimental data is obtained the same as the Fickian diffusivity at absorption. Two parameters are obtained independently from experimental data. Such results confirm that Fickian part of diffusion predicted by the dual stage model is sound.
5) That the Fickian diffusion is a reversible process is also supported by the consistency of the Fickian saturated moisture concentrations obtained both from absorption and desorption, separately.

Figure 3 Moisture weigh gain and loss curve at 85°C/85%RH and 85°C/0%RH

Figure 5 Desorption curves at various elevated temperatures by *in-situ* method

Table 3 presents the test data of the total mass loss during desorption from the moisture analyzer and the manual balance readings, respectively. It can be seen that the differences between the two readings are very small. It is very important to verify the data of the moisture analyzer by the external balance readings. There are two major sources of errors that could be possible in using the moisture analyzer. The first one is the incorrect setting of the purge time to remove the ambient moisture in vial before the test. Another source of error is the inability to have a complete seal by the septum. At higher temperature, the septum tends to warp and therefore it is possible that moisture from ambient will enter into the vial continuously.

Table 3 Comparison of moisture mass loss between moisture analyzer and balance

Temperature

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