

Evaluation Methods of High Reliability Insulation Technology for Electronic Equipment.

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The electric equipment is becoming small in size, light in weight, and high in performance. The printed wiring boards for the equipment are designed in fine and high density, which results in a small distance and high electric field strength between the foil conductors on the board. The insulating failures may occur on the board under such conditions. Therefore, an insulating reliability comes up to one of the important problems for the design of electronic equipment and systems. From these viewpoints, the investigation committee started in April 1996. About 30 members joined to this committee. The main subjects of the committee are as follows.

- (1) Survey On test methods for insulating failures due to the ionic migration.
- (2) Comparison of factors affecting insulating failures with results from life tests.
- (3) Assessment of the standard test method of insulating reliability.
- (4) Research for cause of the insulation failure in electronic equipment and systems.

We have held 13 committee meetings and 4 organizer meetings since the start of this committee. To investigate the above subjects, the round robin tests of the ionic migration were carried out by more than 10 members. The round robin test carried out was an endurance test against the migration under the environmental conditions 85°C and 85% RH. Three kinds of the insulating board were used; Bakelite board without solder coating on the foil conductors, and Epoxy/Glass-fiber boards (FR4) with and without the solder coating on the conductors. The test pattern of the foil conductor on the board was prepared according to IPC-SM-840. The distance between the conductors was 0.16mm. The applied voltage to the conductor was dc 50V. The test was performed for more than 6,000 hours. Now we are discussing the results of the round robin test. The discussions are focused mainly on the following points.

1. Insulating resistance between the conductors or test pattern.
 - 1-1 Dependence of the resistance on time.
 - 1-2 Change in the resistance due to a generation of the ionic migration.
2. Dielectric characteristics (Capacitance and dissipation factor) for the test pattern.
 - 2-1 Dependence of capacitance and dissipation factor on time.
 - 2-2 Changes in capacitance and dissipation factor of the pattern due to a generation of the ionic migration.
3. Observation of the ionic migration.
 - 3-1 Microscopic observations.
 - 3-2 Analysis of chemical products due to the migration.
3. Assessment Of evaluation method for an endurance of the wiring board against migration.

At the end of the committee, we will publish a technical report based on the discussions shown above.

Interfacial Electronic Phenomena and Intellectual Properties of Organic Thin Films

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The committee started in January, 1997 by 25 members to investigate and discuss the interfacial electronic phenomena and intellectual properties of organic thin films and will be continued until December, 1999. We have held 8 committee meetings and 4 secretary meetings up to July, 1998. The main investigation subjects in the meetings are as follows.

- (1) Trends and topics on the nano-interfacial phenomena in highly-ordered organic thin films and super-