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Adhesion test for UTCP structure in humid environment

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Abstract

Ultra-Thin Chip Packaging (UTCP) technology enables the integration of *off-the-shelf* integrated circuits into thin substrates such as different kinds of circuit boards. This technology has been created at CMST during many years of intensive study. In this technology the thinned chip is embedded into polyimide and a copper fan-out is created to form the connections between the chip and the circuit board. This technology is compatible with standard circuit board manufacturing technology, which makes it an attractive solution to create miniaturized packages for electronics.

In this paper the reliability of UTCP structure was studied using adhesion peel testing. The different solutions for constructing the material layers inside a UTCP were compared for their adhesion. Special test structures were manufactured for testing. The tested material layers consisted of polyimide, benzocyclobutene (BCB) and adhesion promoter for BCB. Altogether four different constructions were tested and the peel testing was done to half of the samples right after manufacturing and to the other half after exposure in 85/85 –environment for 500h.

The results show difference in adhesion after exposure to humidity. Test structures with BCB suffer from loss of adhesion in PI – BCB interface after exposure to moisture. This result addresses that the structure is more reliable when the amount of different materials and interfaces is decreased.