

# 플립칩 범핑에서의 신뢰성 향상

## (Improvement of Reliability in Flip Chip Bumping)

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### Abstract

Improvement of reliability in flip chip bumping by controlling unit processes was studied.

The adhesion between sputtered Ni and electroplated Ni UBM was improved by decreasing the NiO film thickness on the sputtered Ni by dry etch process control.

The bump height uniformity was improved from 20% to 9% by controlling electroplating condition such as flow rate, diffuser thickness, etc.

Various types of UBM residue such as the particle type, dendrite type, and crystalline type, were observed on the surface of wafer under inadequate UBM etching condition. These types of residue were cleanly removed from the surface of wafer by applying DOE of main UBM etching variables.

Lamellar structure was observed on the solder bump surface after Ni UBM etching. This structure was due to the preferential etching of Sn in the eutectic SnPb solder bump. Also, the PbO crystal was observed on solder bump surface after Ti UBM etching. This crystal was formed from the oxidation of Pb on solder bump surface. PbO crystal initiation was prevented by the addition of BOE in Ti etchant.

In conclusion, eutectic SnPb solder bumping was successfully done by applying the improved unit processes mentioned above.

Keywords: Flip Chip, Solder Bumping, Reliability, Electroplating, UBM, UBM Etch, Dry Etch