

Possible Methods for Measuring the Impact of Bubbles in Temporary Bonding Materials for 3D Integration

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ABSTRACT

The progresses observed in the microelectronic industry with an increase in applications based on thin wafers and thin microelectronic substrates have made the use of glues for permanent and temporary bonding an essential part in the processing and handling of thin substrates during manufacturing. The evolution of MEMS device technology into high volume production sees the need for materials which have consistent batch-to-batch performance, resulting in high quality coatings with low defect counts. Today's MEMS device manufacturers are focused on increasing yields and eliminating waste rendering the need of a good dispense system more and more necessary. One of the main concerns for integration is the presence of bubbles within the bonding material leading to potential yield degradation.

Because of their high viscosity, spin on glue materials used for permanent and temporary bonding applications are usually difficult to dispense and filter at the point of use and achieve high quality, uniform, bubble-free coatings. In this paper, we will first focus on investigating the use of the IntelliGen® HV dispense system to improve the temporary bonding material coating uniformity and reduce bubble defects. The second main focus will consist in finding a suitable, fast and robust inline metrology tool to detect and quantify defects in bonding materials. Different metrology methods were investigated to measure the effect of filtration on the coating performances. Coating uniformity data were collected by a Senduro reflectometer and bubble defectivity studies were performed using the NandaTech® SPARK inspection tool as shown in Figure 1. Nanda tool is a full wafer inspection system that have both scattered and reflected imaging channels in one. In order to address topology variations and defects for current experiment reflected light optical channel was used.

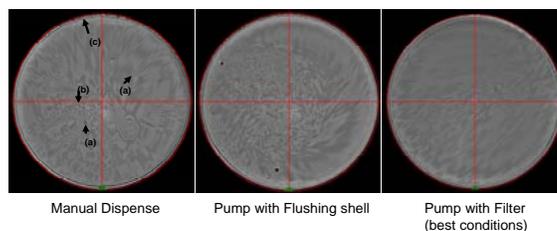


Figure 1. Comparison of the different coating techniques measured using the NandaTech SPARK inspection tool: (a) bubbles, (b) particles and (c) wafer edge bubbles

REFERENCES

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