利用課題番号　：F-13-NM-0027
利用形態　：機器利用
利用課題名（日本語）　：三次元実装に向けた放熱流路評価
Program Title（English）　：Investigation of Microchannels for Liquid Cooling of 3D Systems
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１．概要（Summary）：

3D Systems are a new technology that enable the stacking of integrated circuits into a combined system at the chip or wafer level. The resulting system has a higher heat density than traditional 2D systems. New methods for removing heat from these systems are necessary for them to be practical. To this end methods for integrating microchannels for liquid-cooling are being developed.

２．実験（Experimental）：

【利用した主な装置】

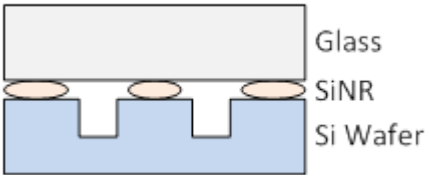
・レーザー露光装置（DL-1000）
・シリコン深堀エッチング装置

【実験方法】

A Si wafer was first patterned using the laser exposure equipment at NIMS. The Bosch Process equipment at NIMS was then used to create microchannels in the Si wafer. The new material, patternable adhesive was then laminated onto the wafers at AIST. The adhesive was then patterned using the laser exposure equipment at NIMS. Next a glass wafer was bonded to the stack using a thermal-compression machine at AIST.

３．結果と考察（Results and Discussion）：

A pictorial version of the cross-section is shown below in Figure 1 and a SEM image in Figure 2.



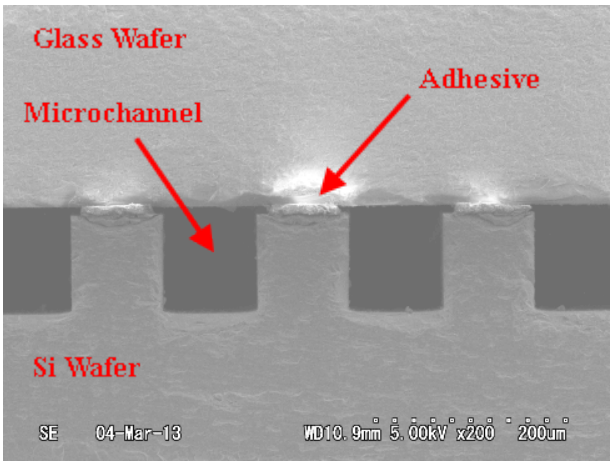


Figure 2: Cross-section of fabricated test-chip.

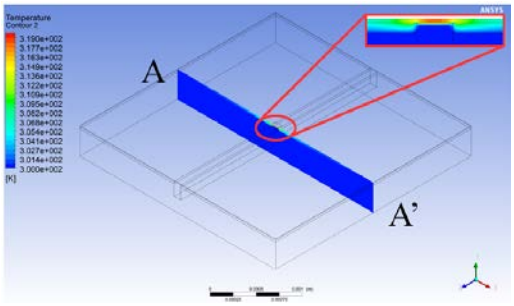


Figure 3: Thermal analysis in ANSYS.

The experiments to date have shown that adhesive can be properly patterned using laser exposure equipment. Additional work is still required to test the strength and stability of the structure.

４．その他・特記事項（Others）：

Current plans are to continue this research at AIST and NIMS in the following year.

５．論文・学会発表（Publication/Presentation）：

なし

６．関連特許（Patent）：

なし