

ABSTRACT

The present invention provides an improved method for wafer-to-wafer
5 bonding. The bonding process of the present invention uses boron oxide glass
(B_2O_3) as an intermediate layer for wafer-to-wafer bonding. In the present
invention, Low Pressure Chemical Vapor Deposition (LPCVD) of Trimethylborate
(TMB) is used to form B_2O_3 on the bonding surface of one of two wafers that
are being bonded together. The second of the two wafers being bonded
10 together requires a layer of thermal oxide at least 300 Å thick. This wafer can
be cleaned with DI water or it can be treated hydrophilically by sulfuric acid or
nitric acid, depending on the device process requirement. The first, or
encapsulant wafer, and the second, or device wafer, are then placed into
contact and annealed at 450° C for 30 minutes, bonding the wafers.

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