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**A novel nanoglue and whole wafer self-alignment based upon self-assembled monolayers** AKO EMANUEL, ERNEST WALKER, HANS HALLEN[1], North Carolina State University — New methodologies for fabrication of multilevel packaging, particularly for RF signal analysis, are investigated. A new method for "gluing" silicon wafers together with a Self Assembled Monolayers (SAMs) based nanoglue are discussed, as are methods to enable its use with nonconforming wafers. Results of bond strength measurements as a function of temperature and process will be presented. Surface area bonded is characterized by infrared (IR) imaging. We will also present a method of inducing self-alignment between whole silicon wafers with micrometer precision. This represents a qualitative departure from alignment of millimeter-sized object as has been previously demonstrated. Self-alignment is induced by creating hydrophilic and hydrophobic regions on the wafers and using capillary forces of water in these regions to force the wafers to align with little to no outside influence. Results are characterized by IR imaging. Physical ideas that enable the whole-wafer alignment such as flow channels, elimination of secondary minima, large central capture areas and small edge features are discussed. The possibility of aligning with the nanoglue materials as the alignment drivers is discussed.

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