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Film-Wafer Bonding for Thermal Studies of a Twist Si Grain Boundar DONGCHAO XU, BO XIAO, HONGBO ZHAO, QING HAO, Univ of Arizona — At the nanoscale, interfaces play an important role in suppressing the phonon transport. A good example of such interfaces can be grain boundaries within a polycrystal [1]. In molecular dynamics simulations, the interfacial thermal resistance of a grain boundary has a strong dependence on the misorientation between two grains [2,3]. Such dependence has been found on bonded identical Al2O3 wafers with relative rotation, representing a twist grain boundary [4]. However, the measurements on similar twist Si grain boundaries are still lacking. In this work, a 70-nm-thick Si thin film was hot pressed onto a Si wafer to represent a grain boundary. Such film-wafer bonding allowed better contact compared with bonding between two rigid wafers. The obtained film-wafer interfacial thermal resistance was measured as a function of the rotation angle between the film and the wafer. The results were further compared with the predictions in previous studies. References: [1] Cahill et al., J. Appl. Phys. 93, 793 (2003). [2] Cao et al., J. Appl. Phys. 111, 053529 (2012). [3] Kimmer et al., Phys. Rev. B 75, 144105 (2007). [4] Tai et al., Appl. Phys. Lett. 102, 034101 (2013).

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