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Evolution of the Elastic Modulus and Hardness of Benzocyclobutene During the Curing Process MICHAEL GRZESIK, University of Massachusetts, Lowell, SHIVASHANKAR VANGALA, WILLIAM GOODHUE, WALTER BUCHWALD, UNIVERSITY OF MASSACHUSETTS, LOWELL COLLABORATION, AIR FORCE RESEARCH LAB/ SENSORS DIRECTORATE COLLABORATION — Benzocyclobutene (BCB) is a polymer possessing both processing and material properties making it suitable for use as an interlayer dielectric in the fabrication of multi-chip modules and as an adhesive for indirect wafer bonding. Both, the elastic modulus and hardness of BCB were studied as a function of curing percentage. Curing percentage was determined by means of Fourier transform infrared transmission spectroscopy (FTIR). Elastic modulus was measured by nanoindentation, which is demonstrated as a means to determine curing percentage. Measurements were taken spanning the polymers solid phase curing from 48% to fully cured. The reduced modulus was found to decrease from 4.78 GPa at 48% cured to 3.35 GPa at fully cured, while the hardness increased from .191 GPa to .246 GPa. Knowledge of the mechanical properties of the adhesion layer during the curing process allows one to optimize the temperature ramping profile during the bond process, in order to improve yield.

Michael Grzesik
University of Massachusetts, Lowell

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