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3D Printing of Ball Grid Arrays SHAYANDEV SINHA, Univ of Maryland-College Park, DANIEL HINES, Laboratory of Physical Sciences, ABHIJIT DASGUPTA, SIDDHARTHA DAS, Univ of Maryland-College Park — Ball grid arrays (BGA) are interconnects between an integrated circuit (IC) and a printed circuit board (PCB), that are used for surface mounting electronic components. Typically, lead free alloys are used to make solder balls which, after a reflow process, establish a mechanical and electrical connection between the IC and the PCB. High temperature processing is required for most of these alloys leading to thermal shock causing damage to ICs. For producing flexible circuits on a polymer substrate, there is a requirement for low temperature processing capabilities (around 150 C) and for reducing strain from mechanical stresses. Additive manufacturing techniques can provide an alternative methodology for fabricating BGAs as a direct replacement for standard solder bumped BGAs. We have developed aerosol jet (AJ) printing methods to fabricate a polymer bumped BGA. As a demonstration of the process developed, a daisy chain test chip was polymer bumped using an AJ printed ultra violet (UV) curable polymer ink that was then coated with an AJ printed silver nanoparticle laden ink as a conducting layer printed over the polymer bump. The structure for the balls were achieved by printing the polymer ink using a specific toolpath coupled with in-situ UV curing of the polymer which provided good control over the shape, resulting in well-formed spherical bumps on the order of 200 um wide by 200 um tall for this initial demonstration. A detailed discussion of the AJ printing method and results from accelerated life-time testing will be presented

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