Integration of LIGA Structures with CMOS Circuitry

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Successful direct integration of a mechanical structure fabricated by LIGA on a Si chip containing CMOS circuitry has been achieved in this work. A one-dimensional cantilever accelerometer is chosen as a vehicle to demonstrate this integration process. The capacitive sensor element employs one electrode formed in the Si substrate during integrated circuit (IC) fabrication. The other electrode is fabricated using the LIGA technique along with sacrificial layer etching. Details of a post-IC fabrication process to achieve this integration are given. Need for careful control of stress in the deposited layers on both the chip and the X-ray mask is delineated. Achieving a high contrast in the X-ray mask is necessary. The process developed here can also be utilized for integrating high-aspect-ratio structures obtained with a thick UV resist such as SU-8 with circuitry on the same chip.