Minimum scale controlled topology optimization and experimental test of a micro thermal actuator

This paper is concerned with the optimal topology design, fabrication and test of a micro thermal actuator. Because the minimum scale was controlled during the design optimization process, the production yield rate of the actuator was improved considerably; alternatively, the optimization design without scale control resulted in a very low yield rate. Using the minimum scale controlling topology design method developed earlier by the authors, micro thermal actuators were designed and fabricated through a MEMS process. Moreover, both their performance and production yield were experimentally tested. The test showed that control over the minimum length scale in the design process greatly improves the yield rate and reduces the performance deviation.

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