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Bi-Stable Thermal Actuators JULIA AEBERSOLD, BRIAN GOESSLING, University of Louisville, EVGENIYA MOISEEVA, CINDY HARNETT, University of Lousiville — Conventionally, most MEMS devices are constructed and remain within the plane of the wafer. Presented here are devices that have been released from a silicon wafer and generate a profile that can be electrically manipulated above the wafer surface. The advantage of this profile is that the devices can be employed in a gaseous or liquid flow parallel to the wafer surface to capture trace elements or gaseous vapor of interest for either liquid or gas analysis. Additionally, the selection of particular thin films and their thicknesses can benefit from differing thin film stresses to control the shape and profile of the released structures. Electrical manipulation of the devices by varying voltage application can alter the shape of the devices due to thermal heating and differences in the thermal coefficients of expansion of the selected materials. Actuation of the devices can enable possibilities of motion of the device (i.e. walking) or transfer of items from device to device. Presented herein is the fabrication process, the relationship of the shape of the devices based upon the fabricated pattern, thin film metal selection, film thicknesses, with SEM images of the electrically manipulated devices.

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