Polyimide Thermal Micro Actuator

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Introduction

A common bent beam chevron actuator is used in order to produce displacement in a particular in plane direction. By using its original shape, the structure amplifies the thermal expansion of the structure material. In this work we expect also a bimorph effect, because we will be using different materials to generate the in plane displacement.

Design Parameters

The chevron actuator is a type of bending-beam micro thermal actuator. The structure can be defined with the parameters shown above: Beam Length (BL), Beam Angle (BA), Offset (OF), and Beam Width (BW).

Results

Figure 5. Simulation of a chevron thermal actuator with configuration BA: 6 BL:100 and BW:5. Applied voltage 0.3 V, maximum displacement 0.7775 μm.

Figure 6. Graph showing the admissible voltage to actuate a chevron with configuration BA: 6 BL:100 and BW:5.