Topology optimized electrothermal polysilicon microgrippers

This paper presents the topology optimized design procedure and fabrication of electrothermal polysilicon microgrippers for nanomanipulation purposes. Performance of the optimized microactuators is compared with a conventional three-beam microactuator design through finite element analysis. The accuracy of the finite element model is verified by comparison of simulated and measured displacement vs. bias voltage curves. A considerable improvement in the mechanical stiffness is indicated by AFM force measurements, being 9 times higher compared to the conventional three-beam actuator. (C) 2008 Elsevier B.V. All rights reserved.