High aspect ratio SU-8 microstructures

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PROJECT DESCRIPTION:

SU-8 microstructures can be made with as high precision as other resists. In addition, it is highly transparent and has very good mechanical properties, and thus can be made in large dimensions and high aspect ratio.

A patented UV lithography based ultra thick SU-8 process was developed for producing structures as thick as 1000 um, with highly vertical sidewall and an aspect ratio of 40:1. SU-8 components have been produced both as end products and as master moulds for fabrications of components in other materials.

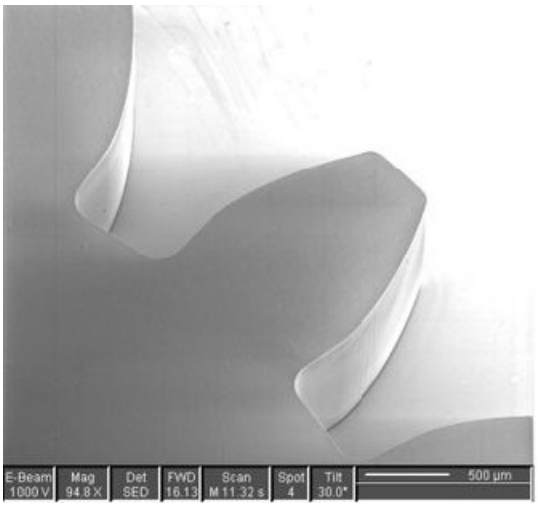

Figure 1. A microgear with high quality sidewall and smooth surface.

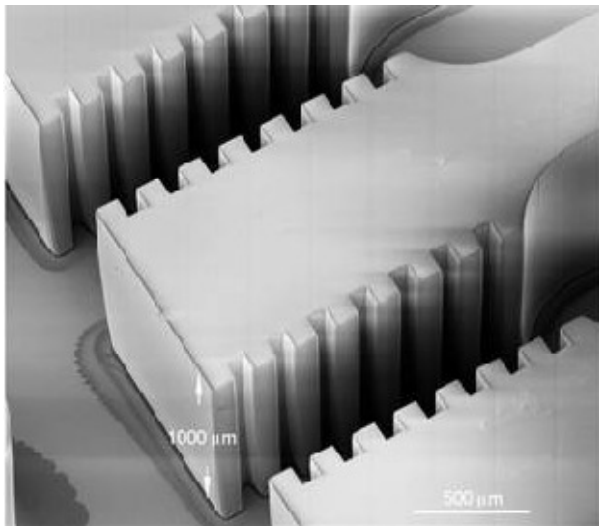

Figure 2. An array of micropistons with 10:1 vertical trenches.

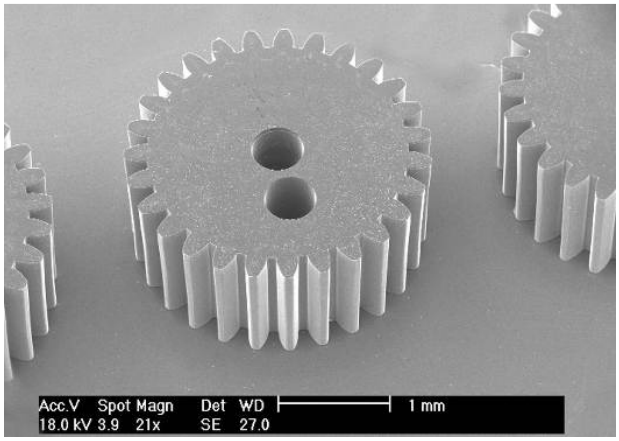

Figure 3. Three microspur gears with 0.4 mm through holes.

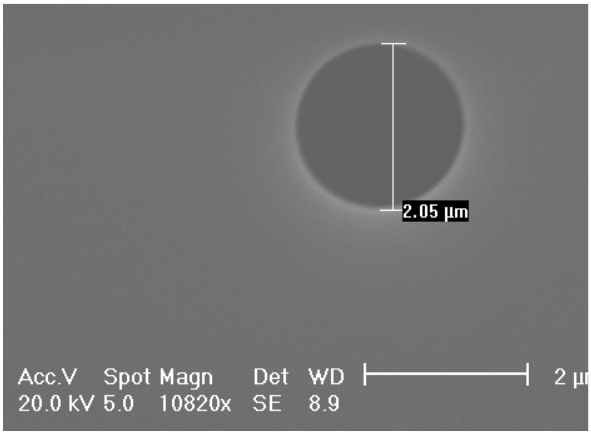

Figure 4. An SU-8 microhole of 2.05 µm in diameter.

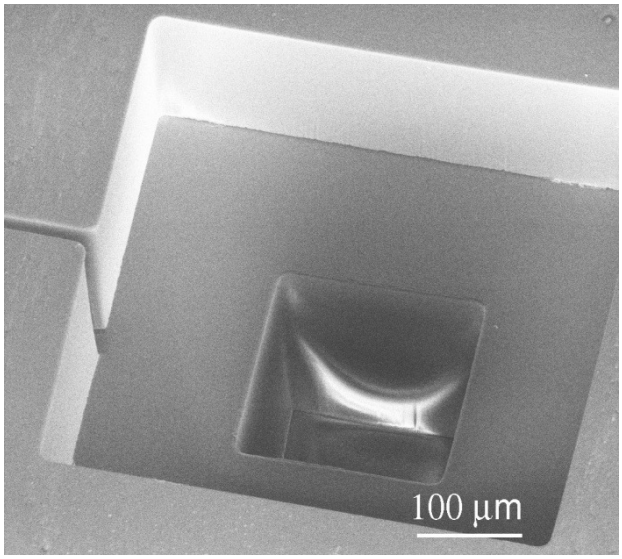

Figure 5. A multiple layer SU-8 microstructure, where a pocket is in the bottom layer and a high aspect ratio trench is in the top layer.

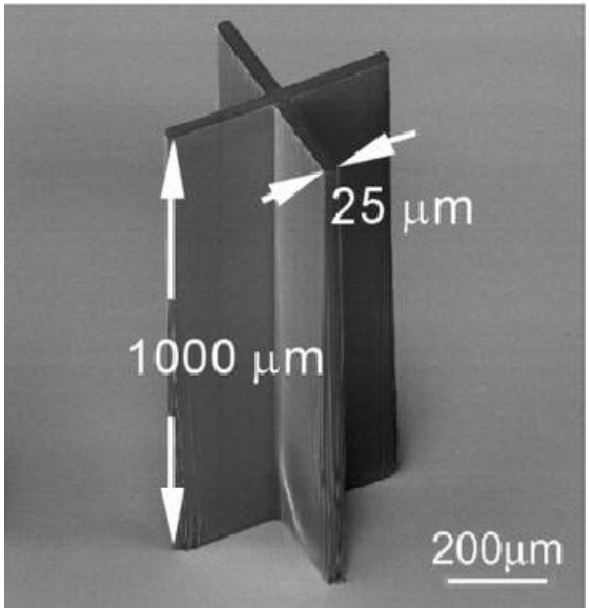

Figure 6. An SU-8 microcross with 40:1 aspect ratio.

SELECTED PUBLICATIONS IN THE AREA:

1. K. Jiang, M.J. Lancaster, I. Llamas-Garro and P. Jin, "SU-8 Ka-Band Filter and Microfabrication", Journal of Micromechanics and Microengineering, vol 15, no. 8, pp1522-1526, 2005.
2. M. Imbaby, K. Jiang and I. Chang, "Net shape fabrication of stainless-steel micro machine components from metallic powder", Vol. 18, 11, Journal of Micromechanics and Microengineering, vol 19, iss 4, Article Number: 045018, 2009
3. C H Lee and K Jiang, "Fabrication of thick electroforming micro mould using KMPR negative tone photoresist", Journal of Micromechanics and Microengineering, 18 055032 (7pp), 2008.
4. C.H. Lee, and K. Jiang, "Sidewall roughness characterization and comparison between silicon and SU-8 microcomponents", Materials Characterization, vol 58, issue 7, pp603-609, 2007.