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Laser-assisted chemical etching for embedded microchannels and overhanging microstructures on Si/SiO₂ substrates

[George P. Vakanas](#)

Department of Mechanical and Aerospace Engineering, Arizona State University, Tempe, Arizona 85287

Silicon Debug Tools Development, SC9-09, Intel Corporation, Santa Clara, California 95054

[Ampere A. Tseng](#)

Department of Mechanical and Aerospace Engineering, Arizona State University, Tempe, Arizona 85287

[Paul Winer](#)

Silicon Debug Tools Development, SC9-09, Intel Corporation, Santa Clara, California 95054

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The feasibility of fabricating buried (embedded or subsurface) microstructures between silicon and silicon oxide using laser-assisted chemical etching (LACE) in chlorine atmosphere is demonstrated in this article. An associated LACE ablation model and sample calculations based on one-dimensional thermal analysis and chemical kinetics are presented. A strategy for optimizing the laser process for 3D micromachining is outlined. Potential applications of such fabricated microstructures include microfluidic MEMS for transducers and electronic cooling. ©2002 Laser Institute of America.

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