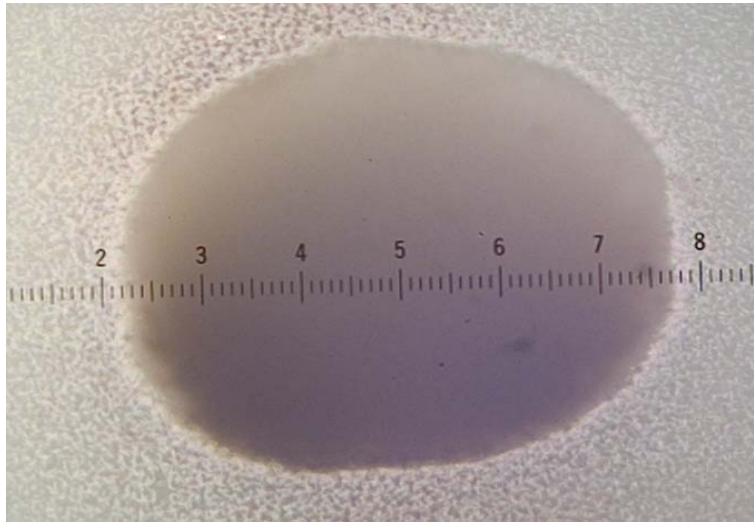


Nano- and Micromachining

Below are several examples of laser machining with Passat picosecond pulses.

$$\lambda=266 \text{ nm}$$

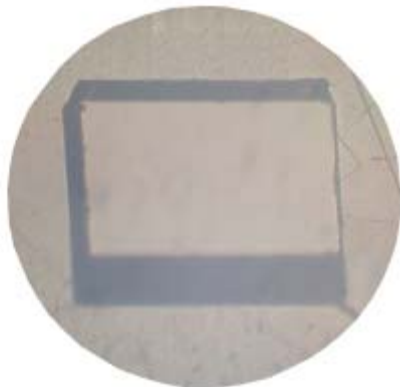
Short UV pulse width and fast plume removal avoid heat accumulation in the deeper layers of polymer, plastic and resin. Depicted below is an example of blind cutting of a polymer with a copper film deposited on its back



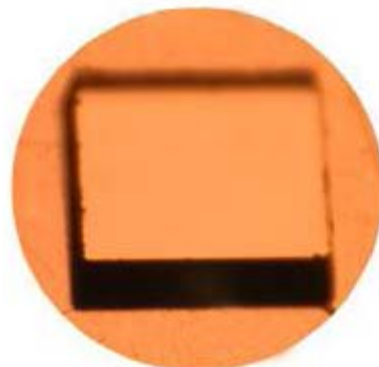
2.5 $\mu\text{m}/\text{div}$

Traces of the copper film are visible in the photo above.

Photos of a rectangular 1 x 1 mm² hole cut in a 400- μm plastic sheet (nylon) are shown below. The black carbon that usually appears on the edges of a cut is absent here.

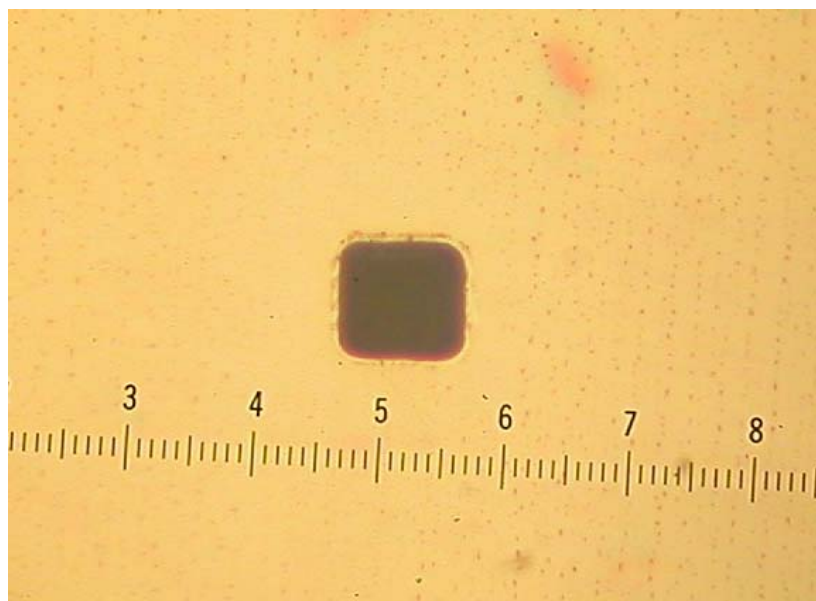
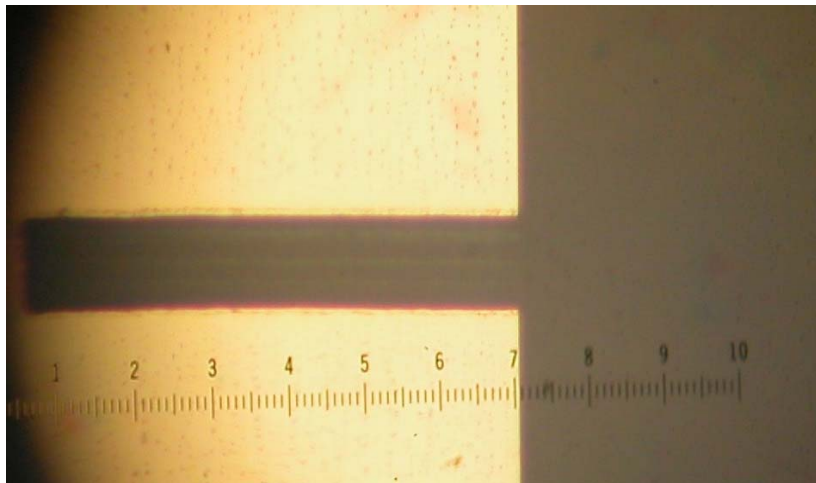


Reflected light



Transmitted light

Another example shows removal of *Cr* deposited on a glass surface

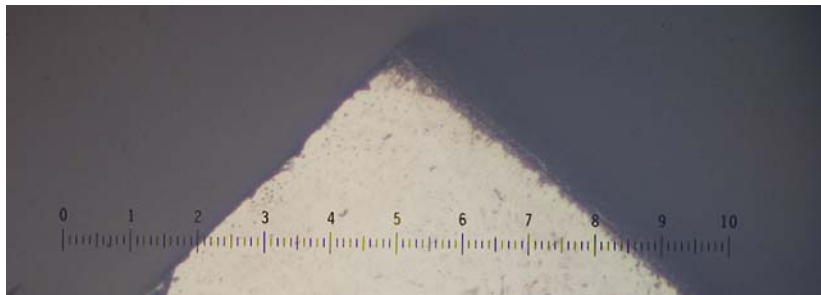


2.5 μ m/div

The Cr removal technology is intended for photo-mask repair because it does not result in a Heat Affected Zone and the hole's irregularities are less than 1 μ m.

$\Lambda=355\text{ nm}$

The photograph below presents an example of cutting out a diamond shaped sample with a thickness of 250 μ m

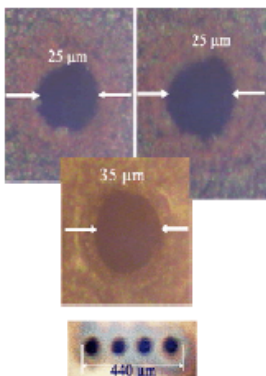


2.5 μ m/div

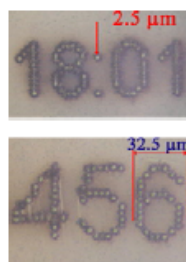
Here only one angle of the cut is shown (the whole size of the removed spot is 1 x 1 sq. mm).

$\Lambda=1200\text{ nm}$

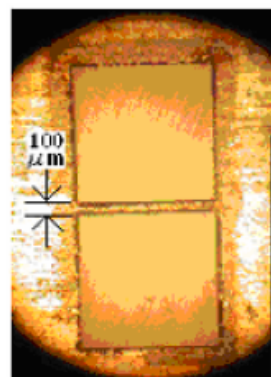
Due to the short wavelength and high peak power of the picosecond UV lasers, it is possible to provide minimum hole diameters as well as minimum slit widths in metal, ceramics and other sheets of material with hundreds of micron thicknesses. The quality of these cuts is practically the same as those obtained with femtosecond lasers



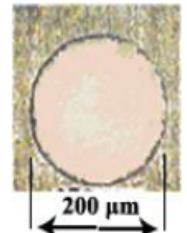
Silicon Wafer Drilling



Silicon Wafer Marking



Tungsten with 100 μ m “bridge”



Molybdenum

The typical rate of micro-drilling is 0.4 μ m for a laser fluency $\sim 10\text{ J/cm}^2$.

Passat USA

720 N. Hammonds Ferry Rd.
 Linthicum, MD 21090, USA
 Tel : (410) 609-2006
 Fax : (360) 323-6971
 E-mail : info@passatinc.com

Passat Canada

401 Magnetic Drive, Unit # 45
 Toronto, Ontario M3J 3H9, Canada
 Tel : (416) 661-9633
 Fax : (866) 422-0959
 E-mail : info@passatltd.com

www.passatltd.com