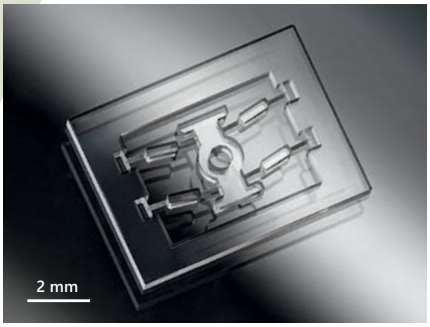
Material processing examples
Made with **FemtoLux 30** laser

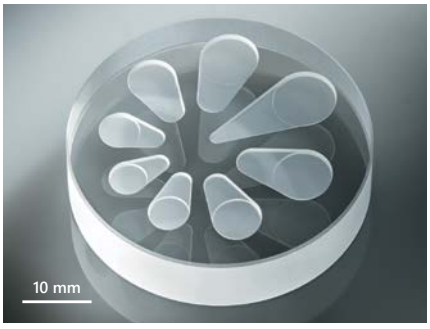


SLE of fused silica. Courtesy of Femtika.

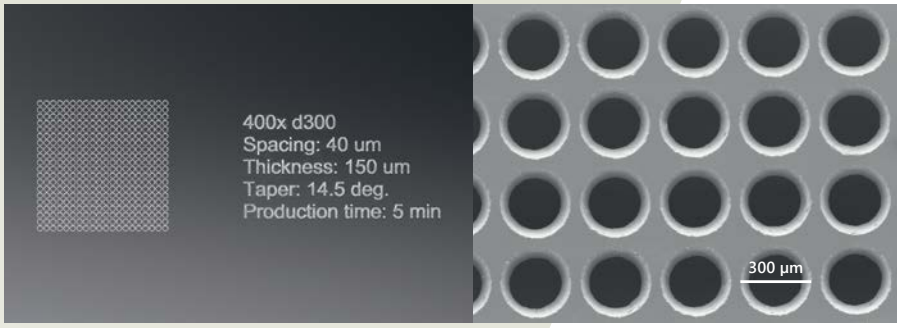
Transparent materials

Transparent materials, such as glass/sapphire are fascinating materials with remarkable properties that have made it a favorite among researchers and engineers for decades. Its robustness, chemical resistance, transparency, and affordability have made it an ideal candidate for a multitude of applications, ranging from microfluidic devices and optical components to electronic devices.

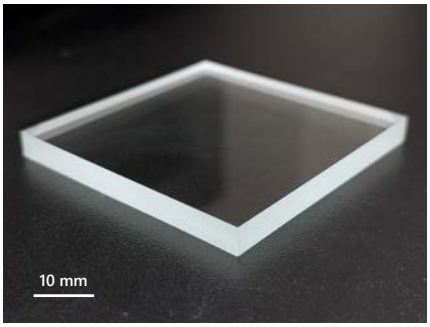
The femtosecond laser micromachining technique has brought transparent materials processing to the next level. Complex structures can now be precisely fabricated by selectively removing material through drilling, cutting, milling, etching and scribing.



UVFS milling. Courtesy of FTMC.



Borosilicate drilling. Courtesy of FTMC.



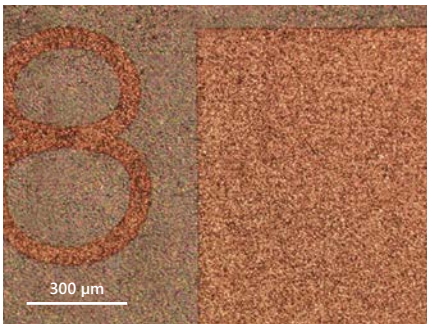
Laser-based Bessel beam scribing of soda-lime glass. Courtesy of FTMC.

Polymers

Polymers are revolutionizing various industries with their exceptional properties, including flexibility, durability, and ease of processing. These versatile materials find application in a wide range of fields, from aerospace and biomedicine to electronics.

Polymer processing with femtosecond lasers has opened up new avenues for precision fabrication of complex structures by selectively removing polymer with high precision and minimal thermal effects.

Femtosecond laser processing can also be used for photo-polymerization, a process where monomers or prepolymers are selectively polymerized to create complex 3D structures with sub-micron resolution, high accuracy, and repeatability.



Insulation layer removal from PCB. Courtesy of FTMC.

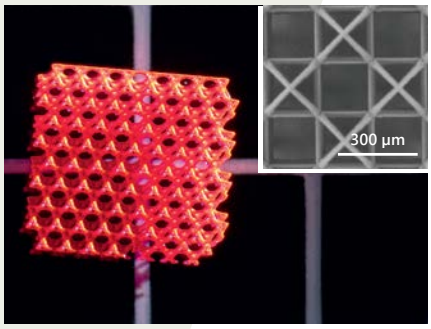


Photo-polymerization. Courtesy of Femtika.

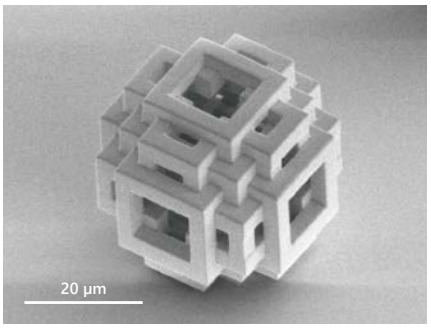
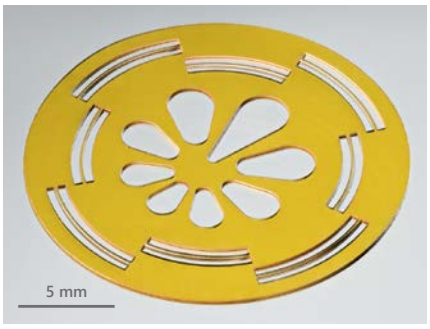


Photo-polymerization. Courtesy of WOP.



Polymide cutting. Courtesy of FTMC.

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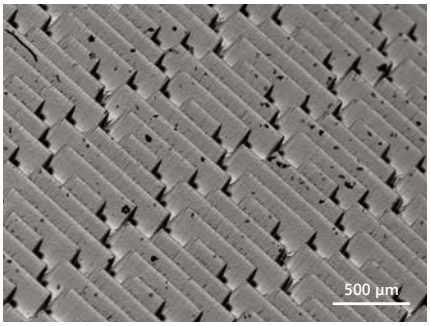
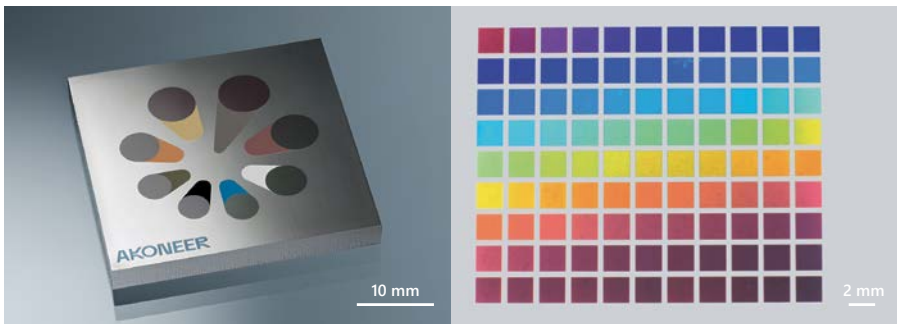
Metals

Metals, particularly stainless steel, has become an integral part of modern engineering and manufacturing thanks to its mechanical, chemical, and aesthetic properties. Its versatility has led to its use in diverse fields such as aerospace, automotive, architecture, and medical equipment.

Femtosecond laser technology has revolutionized metal micromachining, offering an exciting array of possibilities for creating visually stunning and intricately precise structures with minimal heat affected zones. Femtosecond lasers enable the production of complex shapes and features, while also providing the capability to perform black/white marking and coloring without the need for chemical additives.

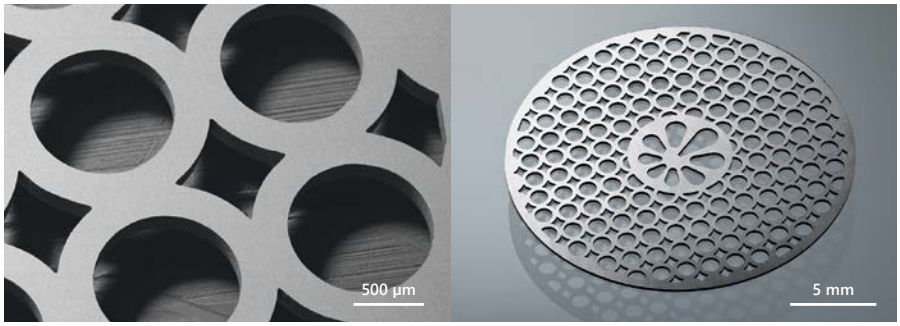


"Shark skin" surface structuring. Courtesy of FTMC.

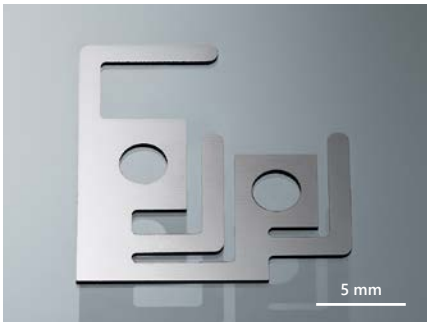


Stainless steel (left) and titanium film (right) coloring with GHz burst feature. Courtesy of Akoneer.

Highly-resistant black marking. Courtesy of FTMC.

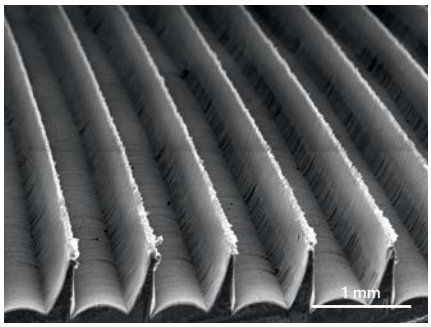


Stainless steel cutting. Courtesy of FTMC.

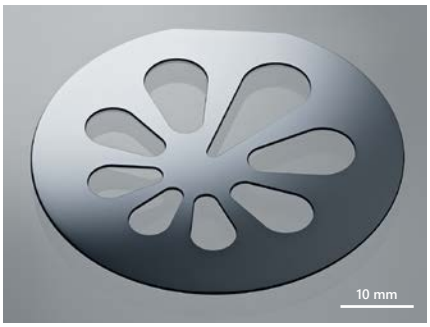


Stainless steel cutting. Courtesy of FTMC.

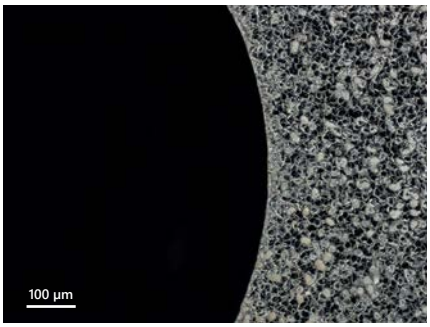
Other materials



Teflon (PTFE) milling. Courtesy of FTMC.



Crystalline silicon cutting. Courtesy of FTMC.



Crystalline silicon cutting. Courtesy of FTMC.