# MICROFABRICATION OF TRANSPARENT POLYMER FOR INTRAOCULAR LENS BY FEMTOSECOND PULSES

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Polymer based Intraocular Lenses (IOL) are optical components applied for cataract treatment because the transmittance of differing wavelengths coincides with the lens of the human eye. The fabrication of such optics is carried out by using lathe cutting and tumble polishing. These methods are fast and can be applied for mass production. Nevertheless, the production of personalized lens by conventional methods are challenging due to diamond-based unyielding machinery. In addition, thermal disposition of the machinery can damage the materials transparent qualities, deeming the final product improper for use.

An alternative microfabrication of lenses can be realized by femtosecond pulses. Femtosecond laser (Ekspla, Femtolux 30) was utilized for ablation and polishing of polymer. This microfabrication technique, based on the cold-ablation approach, mitigates the thermal effect on the polymer and ensures transmittance of visible light to be adequate for the human eye. Moreover, femtosecond laser systems are non-contact and offer wide customization and sustainable micromachining [1, 2].

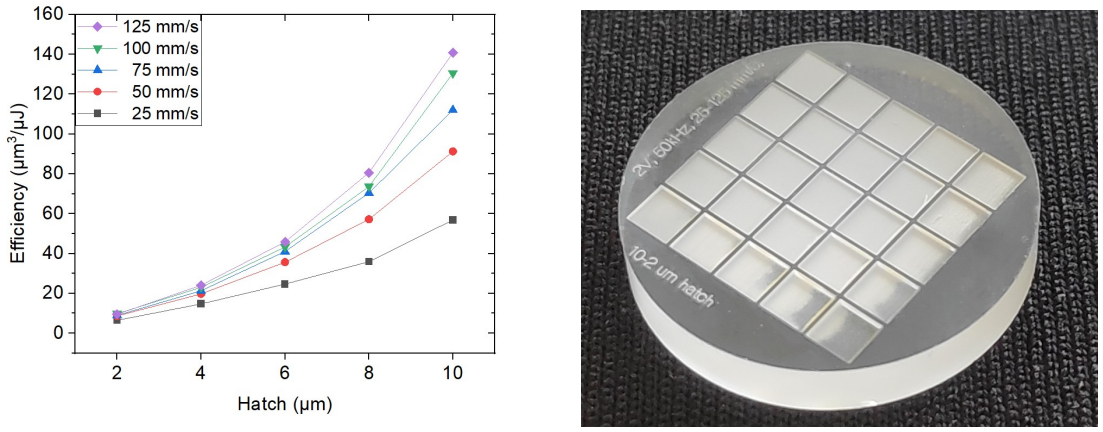


**Fig. 1.** Ablation efficiency of polymeric material versus hatch distance for various beam scanning speeds (left). Cavities ablated on the sample surface, laser fluence of 0.37 J/cm2, 50 kHz repetition rate (right).

[1] [1] Kerse, C., Kalaycıoğlu, H., Elahi, P. et al. Ablation-cooled material removal with ultrafast bursts of pulses. Nature 537, 84–88 (2016). doi: https://doi.org/10.1038/nature18619

[2] [2] Yu, Nan & Fang, Fengzhou & Wu, Bing & Zeng, Lan & Cheng, Ying. (2018). State of the art of intraocular lens manufacturing. The International Journal of Advanced Manufacturing Technology. 98. 1-28. doi: https://doi.org/10.1007/s00170-018-2274-5