Abstract:

This article is aimed to present an improvised technique for inducing periodic structures on glass and Polymethyl methacrylate (PMMA) using low power CW CO2 laser. Glass processing methods are widely recognized as engraving, drilling, cutting, and marking. In this current investigation, a focused laser beam with varying laser power of 0.8W to 2.5W was targeted to form the regular and tidy periodic structures on glass and PMMA. The writing speed is varied from 0.5 mm/s to 4.0 mm/s. The emergence of micro grooves is very sensitive to laser power and scanning velocity, therefore the depths of microchannels have been discussed in terms of these parameters. The XYRIS 2000 CL 3D surface profiler has been used for analyzing glass profile while scanning electron microscope SEM has been used for analyzing profiles of PMMA. In order to achieve the larger channel depth, the low power and low scanning speed has been used. For machining PMMA the depth of trenches is found to be nearly 2mm which is nearly cutting depth. The channel depth of PMMA has increased when the writing speed is decreased. A sub-micron grating structure on glass with the period of 1µm has been observed having depth of 1.5µm. Moreover the optimum condition for laser power and scanning speed is also achieved.