

Improvement in Surface Finish and Geometrical Accuracy by Laser Micro-turning



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Abstract Recently, laser micromachining and micro-fabrication processes have remarkable and diversified applications in the direction to manufacture highly precise and accurate dimensional parts or components which are used in bio as well as technological domains such as biomedical, dental and orthopaedic, aircraft engines, micro-electromechanical systems (MEMS), electronic devices, turbocharger rotor parts and nuclear reactors. The present chapter deals with experimental investigation into micro-turning process using pulsed Nd:YAG laser during machining of aluminium oxide ceramics. A number of experimental schemes were adopted to explore the parametric influences on process characteristics such as surface roughness and depth deviation. Experimental investigation was also carried out to improve the dimensional accuracy and surface characteristics of laser micro-turned components using laser defocusing technique.

Keywords Laser micro-turning · Laser defocusing · Aluminium oxide · Accuracy improvement · Overlap

1 Introduction

Due to some excellent and extraordinary properties of high-tech engineering ceramics such as high strength, corrosion and wear resistance, withstand ability at elevated temperature, high insulation capabilities, these ceramics have wide applications in the engineering fields like aerospace, electronics, electrical, textiles, mechanical, chemicals, food processing and in many others fields [1, 2]. Not only that, the demand of

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