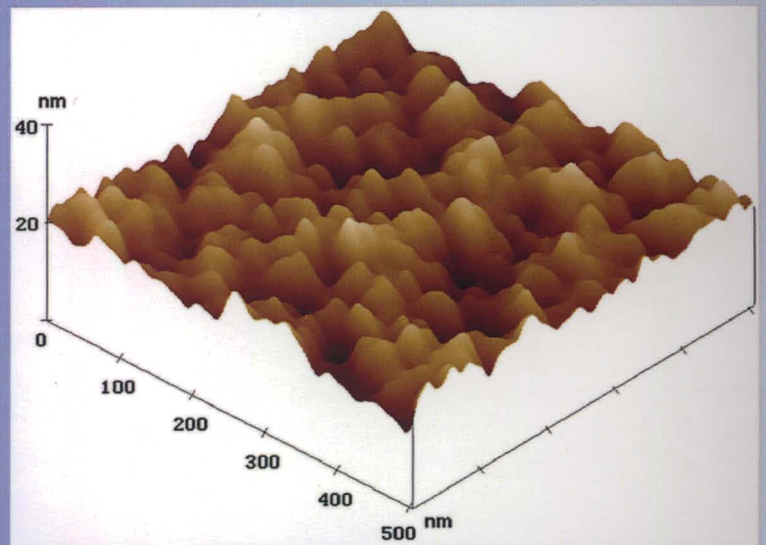
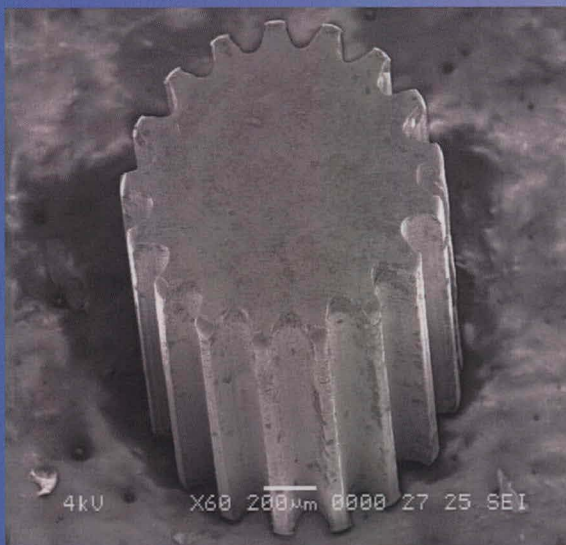
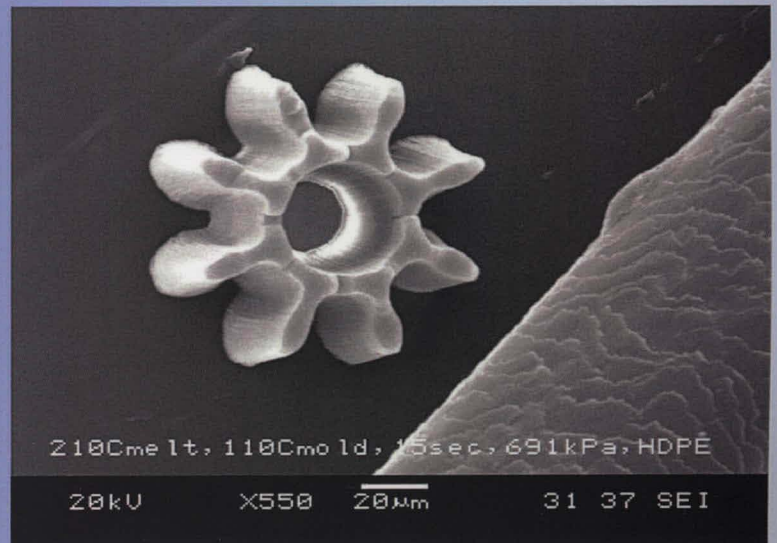
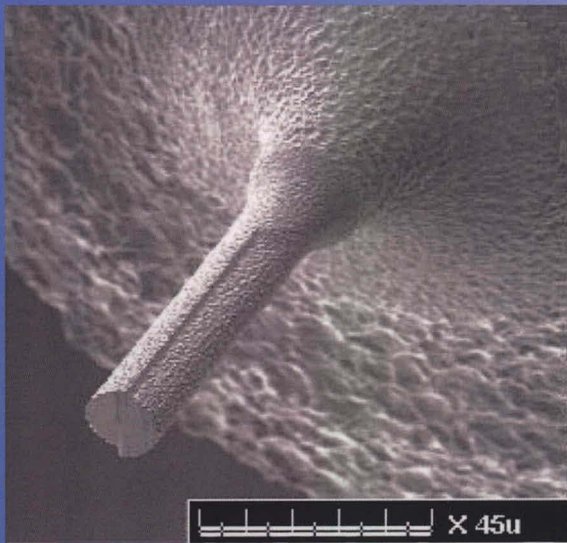


Advanced Machining Process



Editors

Mohammad Yeakub Ali

AKM Nurul Amin

Erry Yulian Triblas Adesta

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Editors

**Mohammad Yeakub Ali
AKM Nurul Amin
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Micro Electro Discharge Machining of Micro Pillar Array: Process Development

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Abstract. This chapter discusses the process development for the experimental study for the fabrication of micro pillar array on titanium alloy. It includes the selection of machine, materials, machining parameters and the design of experiments. DT110 micro EDM machine from Mickrotools Inc., Singapore is used for machining of titanium alloy. So the experimental values of parameters are selected within the limitation of this machine. Fabrication with other parameters values may need initial experiments

Introduction

Micro electro discharge machining (Micro EDM) has been adopted as one of most valuable techniques for micromachining because of its excellence in the fabrication of precise microhole, micromechanical parts, and complex microstructures [1]. Micro EDM removes electrically conductive material by means of rapid and repetitive spark discharges from electric pulse generators with the dielectric flowing between the tool and the workpiece [2]. No physical cutting forces exist between the workpiece and tool. The non contact machining process has been endlessly evolving from a mere tool and die-making process from before to a micro-scale application machining. Micro EDM has similar characteristics to EDM except that the size of the tool, discharge energy, and axes movement resolutions are at the micron level [2].

The main idea of this project is to fabricate micro pillar array by using die sinking micro EDM. In order to fabricate micro pillar array, however, the quality of the surface finish has a significant effect on the product performance, as the surface finish of the cavities is reflected in the final products. It is important to achieve optimum surface roughness and material removal rates by using powder mixed dielectric. The objectives of this research are listed below:

1. To study the influence of micro EDM parameters on titanium alloy (Ti-6Al-4V) with respect to material removal rate and surface roughness.
2. To analyze and determine optimal set of parameters which give low surface roughness and high machining material rates by using factorial design approach.
3. To fabricate miniaturized micro pillar array using die sinking micro EDM with the optimum parameters.