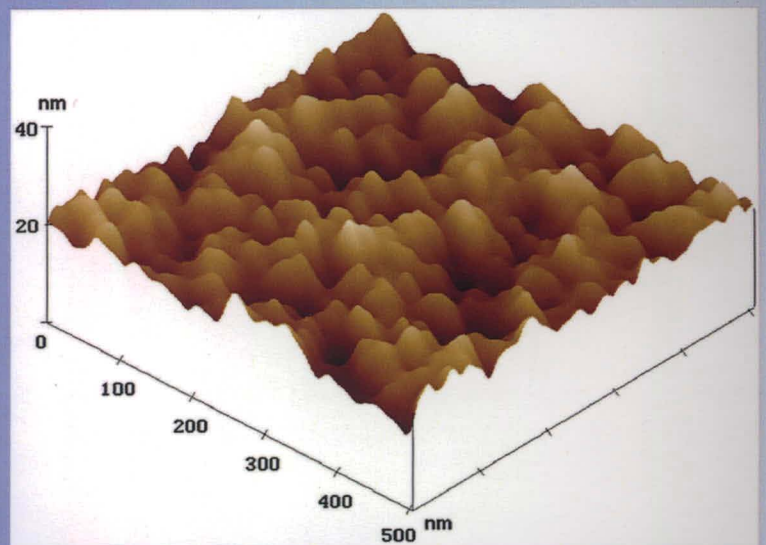
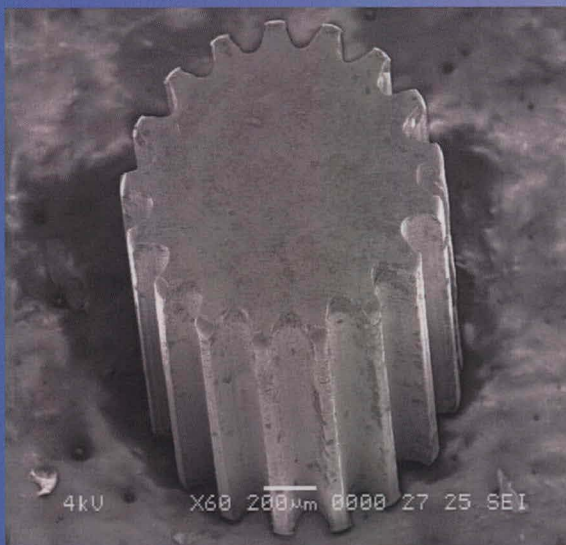
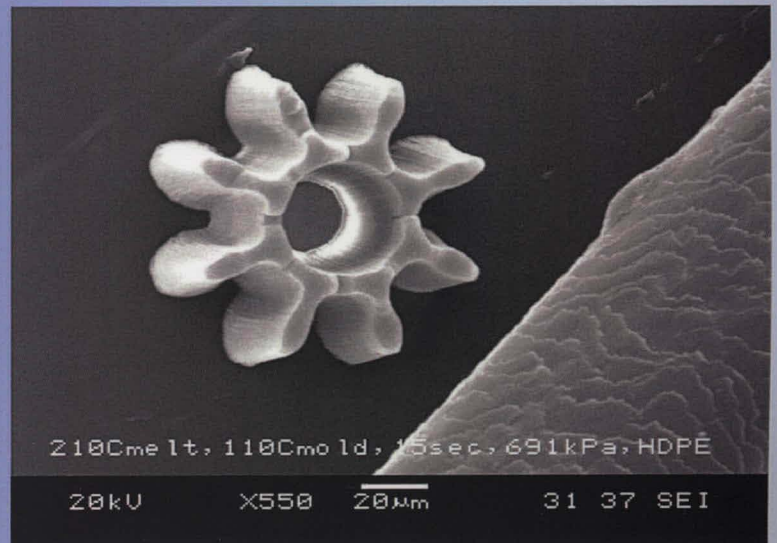
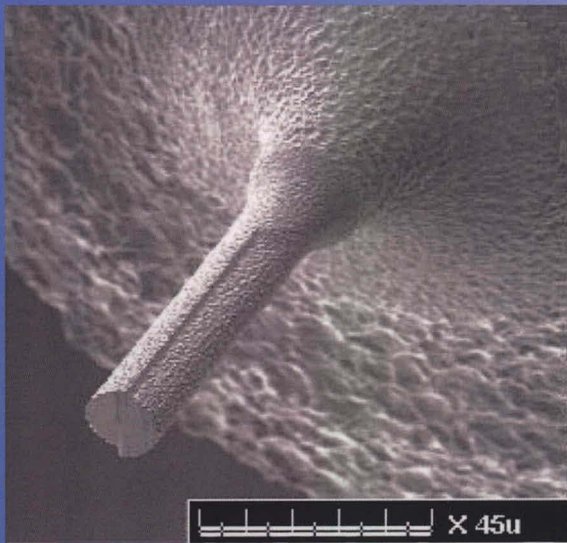


# Advanced Machining Process



Editors

**Mohammad Yeakub Ali**

**AKM Nurul Amin**

**Erry Yulian Triblas Adesta**

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## **Editors**

**Mohammad Yeakub Ali  
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## Features of Electrode Wear during EDM of Mild Steel with TaC-Cu Powder Compacted Electrodes

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**Keywords:** EDM; Tantalum carbide; Copper; PM compacted electrode

**Abstract.** Features of tantalum carbide-copper powder compacted electrodes during EDM of mild steel have been studied. It was found that during EDM electrode wear increases with increase in current and spark on-time. Electrode wear is inversely proportional to spark off-time. Due to increase in off-time, energy density decreases that caused reduction of electrode wear. Interaction effects show that the influence of current and off-time is almost equal. However, interaction effect of spark on-time and off-time is significant.

### Introduction

EDM is widely used in industries to make dies and molds with hard materials that cannot be machined with conventional techniques. As time going on, EDM users tried to find out other methods to replace the conventional tool electrode and they come out with alternative tooling such as powder metallurgy (PM) method of electrode fabrication which is more economic and faster to manufacture. Using PM compacted electrodes the quality work surface can be controlled and modified due to deposition of materials from the electrode. Thermal, electrical, mechanical and micro-structural properties of PM tool electrodes can be controlled effectively by the process variable such as compacting pressure and sintering temperature [1]. Harder layers on the workpiece surface can be beneficial in providing increased abrasion and corrosion resistance to the workpiece [2].

The present work focuses on the development of powder metallurgy compacted electrode for EDM. The types of powder used are tantalum carbide (TaC) and copper (Cu). Both of these materials are mixed and compressed together to produce an electrode which can be used for EDM known as green compacted electrode. This electrode was called as green compacted because it did not going through sintering process. The electrode has been used in EDM and there are three parameters need to vary which are current, on-time and off-time. The compacted electrode was glued to a solid copper piece in order to have its required length as shown in Fig.1.



Fig.1: TaC/Cu green compacted electrode joined with a copper holder