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3.2.1 Number of papers published per teacher in the Journals notified on UGC website during the year

ACADEMIC YEAR 2024-2025

S.NO	Author Name	Title of the Papers	Journal Name	Publisher	Year
1.	Saravanan Krishnamoorthy	Investigation the Impact of Laser Surface Texturing on Tribocorrosion and Cytocompatibility Performance of Mg-Zn-hBN Nanocomposites	International Journal of Metalcasting	American Foundry Society (Springer)	**2024**
2.	Umamaheswari D	Early Diagnosis of Diabetic Retinopathy Using Retinal Network	Multimedia Tools and Applications	Springer	**2025**
3.	Anitha Sebasthiyar	Early Diagnosis of Diabetic Retinopathy Using Retinal Network	Multimedia Tools and Applications	Springer	**2025**
4.	Elangovan T	Surface Integrity and Microstructure Analysis of the AZ31B Magnesium Alloy Machined by Sustainable EDM with a B_4C-Enriched Bio-Dielectric Fluid	The Canadian Journal of Metallurgy and Materials Science	Taylor & Francis	**2025**

5.	Sriram K	Distribution Feeder Reconfiguration for loss Reduction Using Dragon Fly Optimization Algorithm	American Institute of Physics	AIP Publishing	**2025**

INVESTIGATING THE IMPACT OF LASER SURFACE TEXTURING ON TRIBOCORROSION AND CYTOCOMPATIBILITY PERFORMANCE OF Mg–Zn-hBN NANOCOMPOSITES

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Abstract

This paper highlights the impact of various laser surface texturing (LST) patterns on the tribocorrosion and cytocompatibility characteristics of Mg–Zn-xhBN (x-0.5, 1, and 1.5 wt.%) nanocomposites in a simulated body fluid (SBF) environment. The nanocomposite samples were produced by a novel stir ultrasonication casting method, and the tribocorrosion studies were conducted for a normal load of 20 N, a frequency of 3 Hz, and a total stroke length of 10 mm using a linear reciprocating tribometer. The form and extent of corrosive wear as well as the elemental composition were examined and evaluated using scanning electron microscopy (SEM). Additionally, the water contact angle, surface roughness, and laser surface texturing (LST) depth were analyzed by atomic force microscopy. Experimental evidence demonstrated that the cross-groove pattern resulted with an optimum surface roughness values ranging from 7.6 µm to 23.5 µm, a reduction in grain size from 74 nm to 52 nm, and a reduction in the rate of tribocorrosion by 21.6%. Furthermore, the cross-groove patterned Mg–Zn-1.5hBN nanocomposite showed the smallest open-circuit potential decrease (−0.249 to −0.049 V) with the lowest coefficient of friction (0.14) in SBF environment. This is attributed to a formation of strong oxide layer which protects the surface from the SBF environment during the tribocorrosion test. Laser patterned Mg–Zn-1.5hBN surface shows superhydrophobic nature with the contact angle of 154°. The LST with superhydrophobic surfaces enhanced the tribocorrosion resistance of Mg–Zn-1.5hBN nanocomposites, resulting in the development of high microstrain with severe plastic deformation. Cytocompatibility result shows better cell viability at the lower concentration of nanocomposites samples.

Keywords: *Mg–Zn-hBN nanocomposites, stir ultrasonication, laser surface texturing, tribocorrosion, cytocompatibility*

Introduction

Magnesium (Mg) and its alloys exhibit exceptional biocompatible properties and provide sufficient mechanical characteristics. An important point to consider is that Mg alloys have an elastic modulus that is comparable to that of cortical bone.[1–3]Moreover, Mg alloys are extensively utilized in the automotive as well as aerospace sectors owing to low density and excellent specific strength.[4,5] However, the fundamental issue of magnesium alloy as an implanted device is its quick deterioration in the human body, which limits its use in biomedicine.[6] Tribocorrosion has been described as the process of material and lubricant degradation due to the combined causes of wear and corrosion.[7] It has been extensively studied in the context of biomedical applications, namely, in relation to dental and bone implants, as well as in marine applications.[8] Corrosion resistance of Mg surfaces is enhanced by chemical conversion coating, alloying, and engineered surface

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Early diagnosis of diabetic retinopathy using retinal network

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Abstract
Diabetic Retinopathy (DR) stands as the most common eye ailment among people with diabetes. It results from the weakening of blood vessels within the light-sensitive tissue situated at the back of the eye. DR leads to visual impairment and even complete loss of vision. However, vision deterioration can be prevented through early stage detection and appropriate treatment. The automated detection of non-proliferative diabetic retinopathy (NPDR), an initial stage of DR holds substantial importance for early screening, clinical diagnosis, and monitoring the progression of patients' conditions. The proposed work introduces the novel network called Retinal Network (Ret-Net) to identify NPDR using fundus images, taken from the different datasets like Messidor, Kaggle, STARE and IDRiD. The Ret-Net introduces modified hybrid features (Mod-hyfeat) block for sustaining prominent features to identify initial stage of DR. The effectiveness of the Ret-Net is estimated using the metrics such as training, testing accuracy and its losses. Mod-hyfeat blocks in Ret-Net offers significant accuracy and loss of 97.98% and 0.01 respectively for Kaggle image sets. The Ret-Net offers a substantial enhancement in performance than the existing work. A new network called retinal network is designed dedicatedly to classify NPDR patients from healthy people (HP). The convolutional layers with varying filter sizes extract both low- and high-level features of the fundus images. An additive layer then combines the features from these different-sized convolutional filters, such as 1×1, 3×3, 5×5 and 7×7. This output is used to enhance the neuron's learnability in the hidden layer.

Keywords Non-proliferative diabetic retinopathy · Modified hybrid features · Retinal Network · Accuracy · Losses

1 Introduction

Diabetic retinopathy (DR) is the common prevalent consequence of diabetes and the most progressive metabolic disease in the world's working-age population. The World Health Organization (WHO) estimates that 463 million diabetic people were available globally in

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Surface integrity and microstructure analysis of the AZ31B magnesium alloy machined by sustainable EDM with a B_4C-enriched bio-dielectric fluid

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Surface integrity and microstructure analysis of the AZ31B magnesium alloy machined by sustainable EDM with a B_4C-enriched bio-dielectric fluid

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ABSTRACT

Owing to their high work-hardening tendency and low thermal conductivity, machining magnesium alloys is challenging. This study investigated the machining of AZ31B magnesium alloy using sustainable electrical discharge machining (EDM) with boron carbide (B_4C) nanoparticles suspended in waste vegetable oil (WVO) as a dielectric fluid under reverse polarity. The effects of current (I), pulse-on time (Ton) and B4C concentration (PC) on particle removal rate (PRR) and machined surface roughness (MSR) were analyzed. The maximum PRR of 0.0271 g/min and minimum MSR of 3.15 µm were achieved. PRR and MSR increased with I, Ton, PC, but PRR declined at higher levels. Optimal conditions (6A, 50 µs, 10 g/L) enhanced PRR and MSR. ANOVA identified 'I' as the most influential parameter, contributing 11.57% to PRR and 18.57% to MSR. Scanning electron microscope (SEM) revealed surface defects at 6A, 50µs, 15 g/L. The study highlights WVO-based bio-dielectric potential for sustainable EDM applications.

En raison de leur forte tendance au durcissement et de leur faible conductivité thermique, l'usinage des alliages en magnésium à l'aide de méthodes traditionnelles est un défi. Dans cette recherche, on a usiné l'alliage en magnésium AZ31B par usinage durable par électroérosion (EDM) utilisant des nanoparticules de carbure de bore (B_4C) suspendues dans de l'huile végétale usagée (WVO) comme fluide diélectrique en polarité inversée. On a étudié les effets du courant (I), du temps d'impulsion (T_{on}) et de la concentration en B_4C (PC) pour évaluer le taux d'élimination des particules (PRR) et la rugosité de la surface usinée (MSR). On a obtenu le PRR maximum de 0.0271 g/min et la MSR minimale de 3.15 µm. À mesure que I, T_{on} et PC augmentaient, le PRR et la MSR exhibaient une tendance à la hausse; cependant le PRR a diminué à des niveaux de paramètres plus élevés. On a identifié les conditions optimales d'usinage à 6A, 50 µs, 10 g/L, permettant d'obtenir un PRR et une MSR améliorés. L'ANOVA a révélé que 'I' est le paramètre le plus influent pour le PRR et la MSR, contribuant respectivement 11.57% et 18.57%. Les effets paramétriques étaient significatifs aux niveaux linéaires, carrés et d'interaction. L'analyse au microscope électronique à balayage (MEB) a montré des défauts de surface tels que des microfissures, des vides et des cratères, principalement à 6A, 50 µs, 15 g/L. Les résultats ont conclu que le bio-diélectrique à base de WVO avec 10 g/L de B_4C améliorait considérablement les performances d'usinage, mettant en lumière son potentiel pour des applications d'EDM durables.

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Sustainable EDM; waste vegetable oil (WVO); boron carbide (B_4C) nanoparticle; particle removal rate (PRR); scanning electron microscope (SEM)

1. Introduction

Electrical discharge machining (EDM) is a well-established and widely used manufacturing process known for its high-precision machining capabilities [1]. It operates by removing materials from the workpiece through controlled high-intensity electrical discharges, enabling the fabrication of complex and intricate geometries with exceptional accuracy [2]. Although EDM is widely used, achieving better surface quality and machining performance remains a major challenge. The formation of a recast layer on the machined surface negatively affects surface quality and overall performance [3,4]. However, optimising EDM input parameters has been demonstrated to significantly enhance machining performance, as reported by Elaiyarasan et al. [5]. Commonly used EDM electrical parameters include discharge current, on/off time, discharge voltage, and duty factor. Additionally, non-electrical parameters

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Distribution feeder reconfiguration for loss reduction using dragon fly optimization algorithm

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l approach in the establishment of distribution systems, s necessitates the adjustment of sectionalizing and ditions. This paper introduces a reconfiguration method ms, aiming to maximize power system operation ses. To achieve optimal loss reduction, the Dragonfly ascertain the optimal status of network switches. Subsequently, the reconfiguration process involves modifying the state of on/off circuit breakers in the distribution network based on the insights gleaned from DFO. Real-time experimentation on the proposed system is conducted using the 35-bus Indian power network with MATLAB software. The proposed algorithm identifies the optimal configuration as switches 9, 26, 35, 36, and 39, resulting in an actual power loss reduction to 125.25 kW, representing a 37.85% decrease in overall power loss. Following reconfiguration, the minimum node voltage of the system increases to 0.9572 p.u. (node 16).

Topics
Electrical switches, Power distribution systems, MATLAB, Power electronics, Optimization algorithms

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