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Characterizing AA6351/Tib2 Composite Drilling on Abrasive Water Jet Machining

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Abstract: Aluminum is a material that is malleable, soft, and resistant to corrosion. Additionally, it has a high electrical conductivity. It finds widespread application in the production of conductor cables and foil, but it must be alloyed with other elements in order to achieve the greater strengths required for usage in other applications. Aluminum, which has a strength-to-weight ratio that is superior to that of steel, is one of the lightest engineering metals you can find. The purpose of this work is to investigate the microstructural and drilling characterisation of AA6351/TiB2 composites that were produced using the stir casting method. In order to determine the process parameters, the weight percentage of TiB2 was varied between 5 and 10. In order to determine the hardness and optical microstructure of the composites that were fabricated, as well as the effects of machining parameters such as surface roughness and circularity of the composites, the experiments were carried out by using Al-6351 as the workpiece. The drilling process was carried out by an abrasive water jet machine. The value of the result demonstrates that the hardness value has been steadily increasing.
Keywords: AA6351, Tib2, stir casting, optical microscope, Vickers hardness test, surface roughness.

Introduction

When at least two materials, such as metal and a matrix composite, are combined, the result is an improved set of characteristics compared to the parts used alone. Composites' efficiency and adaptability stem from the wide variety of techniques and materials that can go into their construction [6-11]. As a rule, their solutions outperform conventional materials in terms of weight, strength, and longevity. Composites made of metal and strong ceramic reinforcements are called metal matrix composites, or MMCs. Their excellent corrosion resistance, high modulus, and wear resistance are just a few of their exceptional features. Composites like these can have reinforcements in the form of whiskers, short or continuous fibres, or even particles. One of the most common types of composites is particle-reinforced aluminium alloy composites [12-19]. A few examples of their many engineering uses include cylinder block liners, drive shafts, pistons, bicycle frames, and automobiles. When it comes to applications that demand long-term resilience to harsh environments, including high temperatures, metal matrices are better than polymeric ones. Applications necessitating strong transverse strength and modulus in addition to compressive strength for the composite should take this into account, since metals often have greater yield strengths and moduli than polymers [20-26].

When specifying, keep in mind that composites, like all engineering materials, have their own set of advantages and disadvantages. To be clear, composites aren't always the best choice. One of the main reasons composites have been developed is that their final qualities may be tailored by adjusting the combination of reinforcement and matrix. This article uses the sat casting method to produce a new composite material from AA6351 base material reinforced with TiB2 [27-35]. If the final component needs to be fire-resistant, for example, a fire-retardant matrix can be utilised during development to ensure this feature and others are included. After that, the composite material's mechanical qualities, such as its hardness and surface roughness, are determined by a battery of tests. A profilometer was used to ascertain the surface roughness value, while the Vickers hardness test was used to ascertain the hardness value. To find out how round and circular the drilled hole was, the composite material was then machined using an abrasive water jet machine. By adjusting the weight percentage of TiB2, V. Mohanavel determined the hardness, compression, and tensile strength values for AA6351/TiB2 [36-42].

Literature Review

In this study, the aluminium alloy AA6351 was reinforced with TiB2 particles in varying percentages (1, 3, and 5 wt %). The in situ reaction of potassium hexafluoro-titanate and potassium tetrafluoroborate with aluminium melt successfully manufactured the reinforcements. We looked at the composite's hardness, yield strength, and tensile strength. The produced aluminium matrix composites were examined using X-ray diffraction and a scanning electron microscope. TiB2 particles exhibited excellent bonding properties to the aluminium matrix. For a given temperature, the AMCs cause a high level of wear resistance.

In order to establish the amount of relevance of the cutting parameters, AA6351, which is reinforced with 5% SiC and 5% B4C, was subjected to a continuous turning process using a PCD tool. An analysis of variance was then performed [2]. The experimental findings showed that the rate of material removal rises as the feed rate and depth of cut are increased. Cutting speeds were discovered to have an effect on power consumption. At slower cutting speeds, the surface roughness was minimal; but, as the feed rate and depth of cut were raised, the roughness began to rise. Since the Ra was minimal under conditions of low cutting speed but rose under those of high feed rate and DOC, cutting speed was determined to be the most important component in determining Ra.

In the current study, an aluminium alloy AA6351 was fortified with varying amounts of TiB2 particles (0, 4, and 8 wt %). These particles were successfully created through an exothermic reaction between molten aluminium and inorganic salts, specifically potassium hexafluoro-titanate and potassium tetrafluoro-borate. The result was an alloy with exceptional properties. We looked at the composite's microhardness, yield strength, compression strength, microhardness, and tensile strength. Optical microscopy, scanning electron microscopy, and X-ray diffraction were used to characterise the generated aluminium matrix composites. A higher mass percentage of titanium diboride particles is associated with a steady improvement in hardness, tensile strength, yield strength, and compression strength.

In [4], the hybrid materials Al2O3 and Gr are used to strengthen AA6351 in the production process. Researchers looked at the mechanical behaviour and microstructure of the source alloy as well as the composites made from it. The study examines the reinforcing effect of Al2O3/Gr mixed with the parent alloy, specifically looking at the macro and microhardness levels as well as the tensile and flexural strengths. It was necessary to modify an optical microscope in order to describe the composites. As the reinforcement content in the AA6351 base matrix alloy increases, the hardness, tensile strength, and flexural strength all show positive trends. Dispersing Al2O3/Gr particles into the AA6351 alloy greatly improves its mechanical characteristics. Reinforcement has a linear relationship with the composite's hardness and tensile strength.

The aluminium alloy AA6351 is combined with AL2O3 metal to create a composite material using the stir casting method. The material is then examined under a scanning electron microscope to determine its microstructure, hardness, and toughness strength value. The results demonstrate that the composite material's hardness and tensile strength are higher than those of the plain material. However, the toughness value is lower than the plain material's because of the interference of the brittleness between the alloy AA6351 and AL2O3.

Research Cap

We learn by reviewing the academic journals that nobody has discovered the AA6351/TiB2 material's circularity. Most of the time, they have discovered the material's hardness microstructural characterisation; other times, they have discovered the material's circularity or its turning behaviour.

Physical and Chemical Properties of Aluminum

Soft, silvery, and relatively light, aluminium is a metal. Due to its high reactivity, an oxide layer, which is both thin and protective, quickly forms in the environment. Its resistance to corrosion is a result of this. Anodizing, an electrolytic oxidation procedure, is a particular treatment that can further improve and increase corrosion resistance of the oxide-protected aluminium surface [43-49]. Strong reactions between hydrochloric acid and caustic soda occur with aluminium. Contact with cold nitric acid renders it passive, and the reaction with sulfuric acid is weaker. Aluminum has electrical and thermal conductivities that are nearly two-thirds as high as those of pure copper. The element's oxidation number is +3 because of its electrical arrangement, which gives it three valency electrons [50-57].

To improve its qualities, especially its strength, pure aluminium can be chemically combined with other elements to form an alloy. A maximum of fifteen percent of the alloy's weight may come from these additional elements, which include silicon, iron, copper, magnesium, manganese, and zinc. To alloy, these other components must be properly mixed with molten aluminium while the metal is still liquid. Zinc, magnesium, or silicon are some of the components that can alter the qualities of aluminium, including its strength, density, workability, electrical conductivity, and resistance to corrosion [58-65].

By applying heat or cold working, aluminium alloys can be strengthened. As a result of their processing and additions, the properties of individual alloys vary. To improve its qualities, especially its strength, pure aluminium can be chemically combined with other elements to form an alloy [66-72]. A maximum of fifteen percent of the alloy's weight may come from these additional elements, which include silicon, iron, copper, magnesium, manganese, and zinc. The first digit of an alloy's four-digit number indicates the broad class or series to which it belongs, based on the elements that make up the alloy. Solution heat treatment followed by quenching or fast cooling can strengthen certain alloys. By applying controlled heat, the solid alloyed metal can be heated to a precise temperature. A solid solution is formed when the alloy components, also known as solutes, are evenly dispersed with the aluminium. In order to release the atoms of the solution, the metal is either quickly cooled or quenched. The atoms of the solute then crystallise as a finely dispersed precipitate. Both natural ageing and artificial ageing involve this process, which can take place at room temperature or in a low-temperature furnace [73-81].

Cold working is a way to strengthen alloys that have not been heated. Metal is "worked" to increase its strength during cold working, which happens during rolling or forging processes. For instance, as aluminium is rolled to narrower gauges, its strength increases [82-89]. This occurs because atoms are unable to move relative to each other when dislocations and vacancies are built up in the structure during cold working. The metal's strength is enhanced as a result. Adding alloying elements such as magnesium enhances this action, leading to an even greater increase in strength. The US adopted the wrought alloy naming system in 1954, which was devised almost 60 years before by the Aluminum Association's Technical Committee on Product Standards (TCPS) [90-96]. The American National Standard H35.1 was accepted three years after the system was developed. This system of naming became officially international in 1970 when the International Signatories of the Declaration of Accord formally endorsed it. That same year, the Association was appointed Secretariat for Standards Committee H35 on Aluminum Alloys by the American National Standards Institute (ANSI). From that point on, the Association has been the world's leading aluminium industry standard-setter [97-101].

Current management of the alloy registration system is carried out by the Association's TCPS. It takes from sixty to ninety days to go from registering an alloy to giving it a new classification. In 1954, when the present system was first being established, there were 75 distinct chemical compositions on the list. More than 530 active compositions have been registered so far, and that number is only going up. That exemplifies how adaptable and pervasive aluminium has grown in the contemporary environment [102-111]. As things stand, TiB_2 is only used for certain purposes in fields like neutron absorbers, cutting tools, crucibles, impact-resistant armour, and wear-resistant coatings. For the purpose of vapour painting aluminium, evaporation boats make heavy use of TiB_2. Because of its wettability, poor solubility in molten aluminium, and strong electrical conductivity, it is an appealing material for the aluminium industry to employ as an inoculant to refine the grain size while casting aluminium alloys. Applying a thin layer of TiB_2 to a sturdy and inexpensive substrate makes it resistant to wear and corrosion [112-119].

Casting

A common manufacturing method known as casting involves pouring a liquid substance into a mould with a predetermined shape's hollow hole and then letting it solidify. Ejecting or breaking the hardened component, also called a casting, from the mould completes the process. Materials used for casting typically include metals or a variety of time-setting substances that cure when mixed with two or more components; they include, but are not limited to, clay, concrete, plaster, and epoxy. Complex shapes that would be either expensive or too difficult to manufacture any other way are typically cast. Massive machinery, such as beds for machine tools, propellers for ships, etc [120-127].

Hardness is defined as a material's resistance to persistent indentation. One way to quantify hardness is by looking at how well a material resists localised plastic deformation caused by mechanical indentation or abrasion. For example, metals are noticeably harder than most other materials (e.g. plastics, wood). There are various ways to evaluate hardness, including scratch hardness, indentation hardness, and rebound hardness. This is because macroscopic hardness is typically associated with strong intermolecular interactions, yet the behaviour of solid materials under stress is complicated. These parameters are dependent on the ones mentioned earlier, and they determine the ductility, plasticity, strain, strength, toughness, viscoelasticity, and viscosity hardness [128-135].

Microstructure

One kind of microscope that can magnify tiny objects is the optical microscope, which is also called a light microscope. It works by combining visible light with a set of lenses. The optical microscope, the first type of microscope, may have been developed in its current compound form as early as the 17th century. While many sophisticated optical microscope designs strive to enhance sample contrast and resolution, basic models can be exceedingly simple. An object is set up on a stage so that it may be examined up close using a microscope's eyepieces. Stereo microscopes use slightly distinct images to produce a three-dimensional illusion, in contrast to high-power microscopes where both eyepieces normally display the same image. The image is usually captured with a camera (micrograph). There is a wide range of lighting options for the sample. One way to light up a transparent object is from below, while another way is to shine light through (bright field) or around the objective lens to light up a solid object (dark field). One way to find out which way a metal crystal is facing is to utilise polarised light. By drawing attention to minute differences in refractive indices, phase-contrast imaging can boost picture contrast [136-138].

Typically, a turret is used to install a variety of objective lenses with different magnifications. This allows for easy rotation into position and provides the capacity to zoom in. Due to the limited resolving power of visible light, optical microscopes usually have a maximum magnification power of about 1000x. A compound optical microscope can achieve a total magnification of 1,000× by multiplying the magnification of the eyepiece (say 10x) and the objective lens (say 100x). Magnification can be enhanced by manipulating the surrounding environment using substances like oil or ultraviolet light. Scanning probe microscopy, optical microscopy, and transmission electron microscopy are alternatives to optical microscopy that do not require visible light and can thus attain far higher magnifications. Many fields rely on optical microscopy, including microbiology, geology, nanophysics, biotechnology, pharmaceutical research, and microelectronics. When testing tissues, free cells, or tissue fragments using smears, optical microscopy is employed; this area of study is known as histopathology.

Industrial settings often make use of binocular microscopes. In addition to helping with tasks that require accurate depth perception, dual eyepieces alleviate the strain on the eyes caused by prolonged periods spent working at a microscopy station. A long-focus or long-working-distance microscope could be useful in some situations. It may be necessary to look at an object through a window, or there may be industrial issues that could be a threat to the goal. These optics are like close-focus telescopes. Accurate measurement is accomplished with the use of measuring microscopes. In general, there are two kinds. To measure distances in the focus plane, one uses a graded reticle. The second, more antique variety allows the user to position the object in relation to the microscope using a micrometre mechanism and basic crosshairs.

When using transmitted light at extremely high magnifications, point objects appear as fuzzy discs encircled by diffraction rings. A name for this is Airy discs. The capacity to differentiate between two closely spaced Airy discs is considered the resolving power of a microscope (or, in other words, the ability of the microscope to reveal adjacent structural detail as distinct and separate). Resolving fine details is hindered by these diffraction consequences. The quantity and size of the diffraction patterns are impacted by the objective lens's numerical aperture (NA), the refractive materials utilised in its construction, and the wavelength of light (λ). Therefore, there is a limit, the diffraction limit, beyond which distinct points in the objective field cannot be resolved. One aspect of surface texture is surface roughness, commonly abbreviated as roughness. A real surface's normal vector deviates from its ideal form, which quantifies it. A smooth surface has very slight variations, whereas a rough surface has quite substantial ones. Roughness is the high-frequency, short-wavelength component of a surface's measurable properties in surface metrology. To verify a surface's suitability for a given task, however, it is frequently required to know both the amplitude and the frequency.

A physical object's interaction with its surroundings is defined by its roughness. Rough surfaces typically exhibit higher friction coefficients and wear more rapidly than smooth surfaces, according to tribology. Since surface irregularities can serve as crack or corrosion nucleation sites, roughness is frequently a reliable indicator of a mechanical component's performance. Roughness, however, might encourage adherence. When it comes to surface mechanical interactions, such static friction and contact stiffness, cross-scale descriptors like surface fractality tend to be more useful than scale-specific ones. In manufacturing, controlling a high roughness value can be both difficult and expensive, despite the fact that it is generally unwanted. For instance, it's neither easy or cheap to control the surface roughness of components made using fused deposition modelling (FDM). It is common practise to raise the production cost of a surface by smoothing it out. The manufacturing cost and application performance of a component are typically compromised as a result.

A roughness measuring device is necessary because the individual inconsistencies in roughness are too tiny to be seen to the human eye. The surface is traversed by a tiny stylus at a consistent speed for a predetermined distance. Obtaining and amplifying an electrical signal allows for a much increased vertical magnification. Numerical values that describe the surface texture may be shown on graphs and screen outputs from this signal. A conical stylus with a spherical tip and a 2μm radius is the norm for roughness measurements according to ISO. To make full use of this tiny stylus, though, you'll need an instrument with superior mechanical qualities.

Function/Working Principle of Surface Roughness

For example, in many contexts, the sealing or wear characteristics of two surfaces are impacted by their roughness when they are in close proximity to one another and are in constant motion. Although it may seem like a matter of "the smoother, the better" at first glance, there are often other elements at play that make this statement inaccurate. Rough valleys are necessary for lubrication because they retain oil. We must also take the cost into account; producing extremely smooth surfaces is an expensive endeavour, and this activity might significantly increase the bill without much improving performance.

Lubricating two surfaces that are in relative motion (such a shaft and its bearing) does not completely prevent wear. As the peaks fade, any rough surfaces will gradually smooth off. Due to the metal removal, the two pieces' fit will be altered more rapidly than if the finish had been optimal from the beginning. Clamping devices and pins with "interference fits" rely on friction to do their jobs. The use of lip seals to stop the leakage of hydraulic fluids is another example of an application where roughness might affect performance. A fluid layer between the shaft and the seal can be difficult to maintain if the finish is very smooth. Too rough of a finish can abrade the material, which can lead to disintegration and eventual failure. It is common to find tool faults, improper tool settings, speeds, and feeds while inspecting the texture left on a component after machining.

A surface's aesthetic value is not always zero. As an example, the sheet steel utilised for vehicle bodies needs a specific type of finish that enables paint to adhere evenly and without a noticeable "orange peel" effect. The challenge of achieving a strong bonded finish is well-known to anybody who has attempted to paint onto glass. Components made of paper and plastic require the same level of repeatability as components made of metal. A profilometer is a tool for quantifying surface roughness by measuring its profile. Surface topography is used to calculate critical dimensions like step, curvature, and flatness. Many non-contact profilometry approaches are challenging the traditional idea of a profilometer as a phonograph-like instrument that moves a surface relative to its own stylus to measure its surface area. Thanks to non-scanning technology, XYZ scanning is unnecessary for measuring surface topography during a single camera capture. Consequently, topographical changes may be monitored in real time. Modern profilometers are characterised as time-resolved profilometers, and they can measure both static and dynamic topography.

Circularity

To see how near an item should be to a real circle, look for the circularity sign. The two-dimensional tolerance known as circularity regulates the general shape of a circle, making sure it is not excessively oblong, square, or out of round. It is also termed roundness. Regardless of the datum characteristic, roundness is always smaller than the part's diameter dimensional tolerance. The definition of circularity involves taking a cross-section of a spherical or cylindrical object and checking to see if the resulting circle is spherical. Every point on the surface of a circle must fall inside one of two concentric circles. A plane perpendicular to the centre axis of the circular feature lays the tolerance zone (Figure 1).

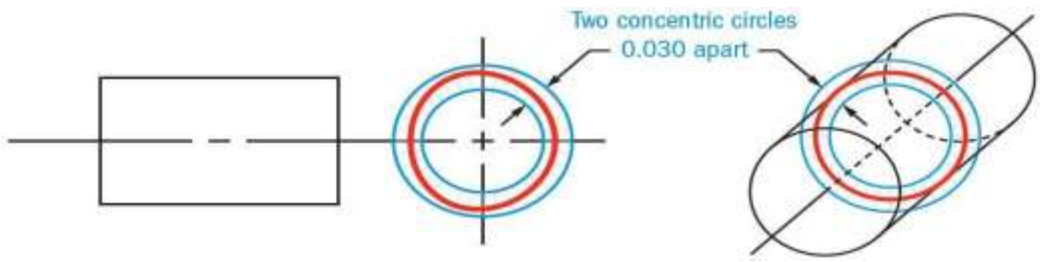


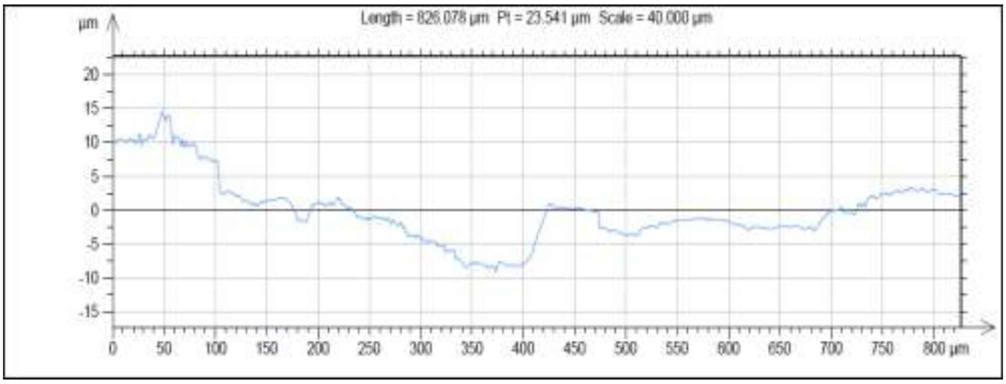
Figure 1: Two concentric circles

Constricting and spinning apart along the central axis measures circularity, while a height gauge records surface change. In two dimensions, circularity is equivalent to cylindricity. When it comes to cylinders, cylindricity makes sure that every point is within a certain tolerance, but when it comes to circles, circularity is all about individual measurements around a single circle. Circumference refers to the area surrounding a single coin in a stack of coins, whereas cylindricity requires the measurement of the complete stack. (the property of being both circular and straight is known as cylindricity). A common measurement used in many areas of production is circularity. When a component, like a bearing or a rotating shaft, must be completely spherical, circularity is typically mentioned. Mechanical engineering drawings frequently feature this GD&T sign.

When computing a statistical tolerance stack, circularity—which defines the shape of the surface in a given area—must be taken into account. Assume, for the sake of argument, that you possess a component that bears a marked circularity and diameter. Since geometric tolerance might add to a bigger part envelope than diameter tolerance alone, you'll need to include both in your statistical stack. Since components are seldom exactly round, this should be taken into account, since it will slightly distort the statistical tolerance.

Results and Discussion

Images of AA651 MMCs with 5% and 10% TiB2 concentrations, respectively, captured electronically. The micrographs show that the TiB2 particles are evenly distributed throughout the matrix alloy and that the typical casting flaws such porosity, shrinkages, and cracks are not present. In order to improve the mechanical properties of composites, it is necessary to have reinforcing particles distributed evenly. According to the measured hardness, the AA6351 MMCs are somewhat harder than the pain aluminium AA6351. The result of Vicker's hardness test was used



to determine the hardness value (Table 1). An essential process response that determines the machinability of the component is the Ra. A reduced MRR during machining is required if surface finish is the primary turning criterion. An uneven profile, increased likelihood of ovality, etc., might result from a higher MRR (Figures 2 to 5).

Figure 2: Pressure: 190 ; Ra : 1.198

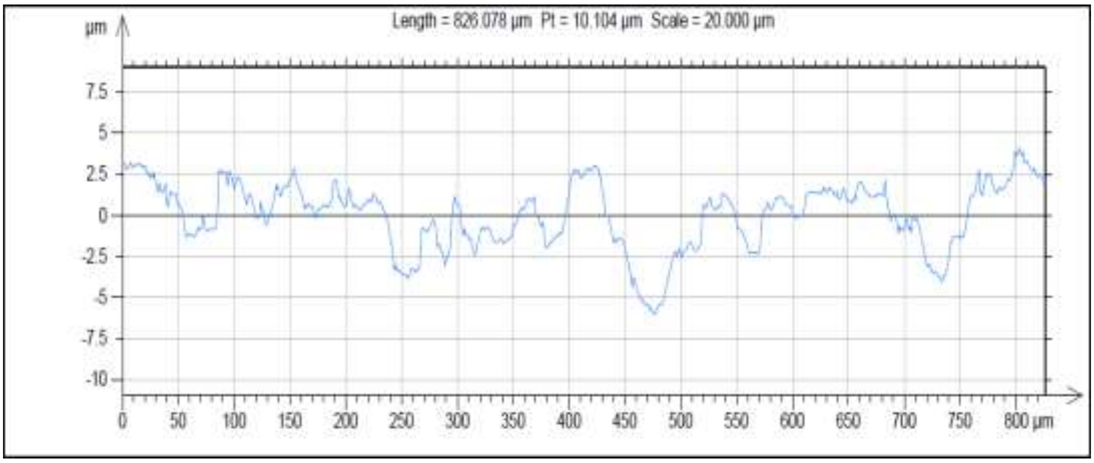


Figure 3: Pressure : 210 ; Ra – 1.246

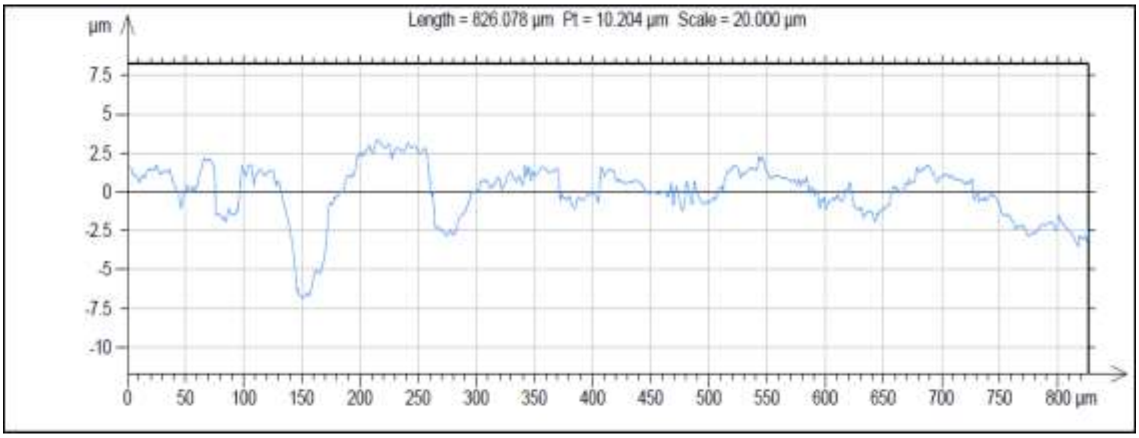


Figure 4: Pressure : 230 : Ra ; 1.502

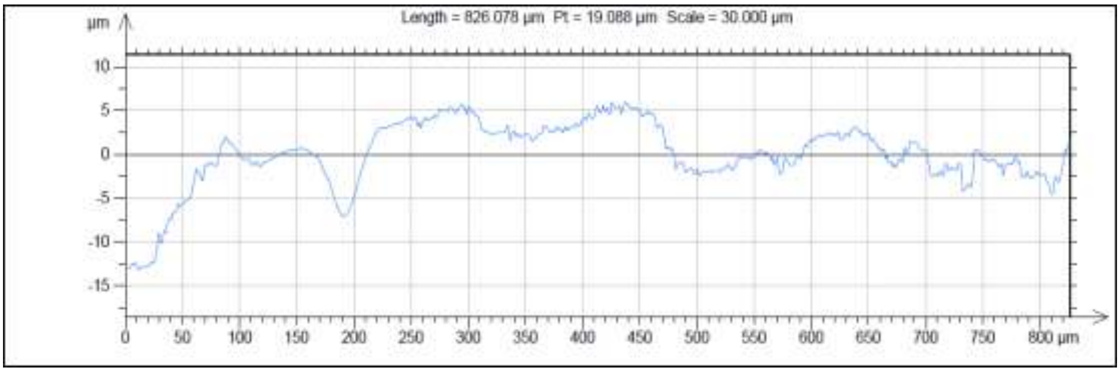


Figure 5: Pressure: 150; Ra = 2.064

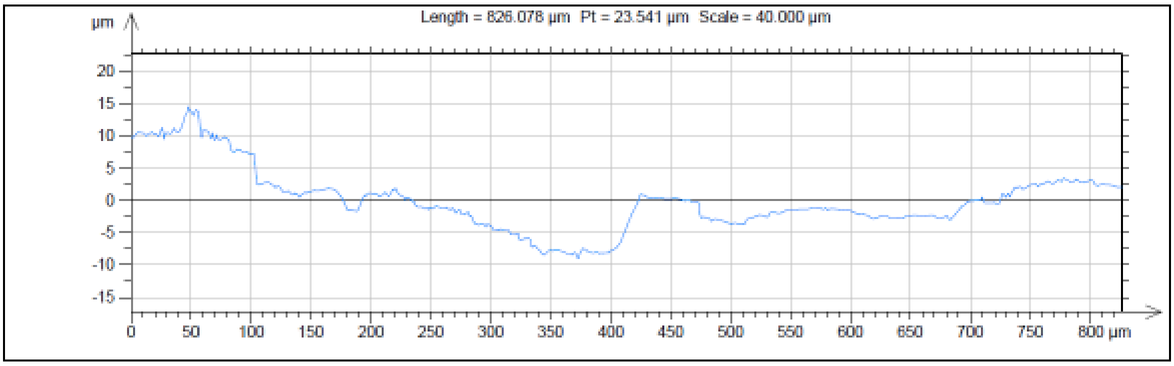


Figure 6: Pressure 190; Ra: 1.198

Figure 6 shows that surface roughness is high at pressure 190, and the respective surface roughness value was Ra: 1.198.

Table 1: AA6351/ 5 wt. % TiB_2 Cu Composites

S.No	Hole No	Out of Roundness OR = L1+L2+L3	Difference between upper and lower diameter (D_u-D_L)
1	170	1.335	+0.178
2	190	1.275	+0.223
3	210	1.349	+0.233
4	230	1.402	+ 0.245
5	250	1.455	+0.265

Conclusion

Photos taken with an optical camera of AA651 MMCs that contain either 5 percent or 10 percent of TiB2 were taken. In addition to revealing the homogenous distribution of TiB2 particles across the whole matrix alloy, the micrographs do not contain any of the typical casting defects that are common, such as porosity, shrinkages, or cracks. In order to improve the mechanical properties of composites, it is necessary to have reinforcing particles distributed in a homogeneous manner. In comparison to the pain aluminium AA6351, the hardness value that was obtained demonstrates that the AA6351 MMCs have a gradually increasing hardness value. In order to determine the value of the hardness, the Vicker's hardness test was utilised (Table 1). For the purpose of determining the quality of the component that is to be machined, the Ra is an essential process response. The material must be machined with a lower MRR if the surface finish is the primary requirement for turning its surface. Having a higher MRR can result in an uneven profile, an increased likelihood of ovality, and other issues.

References

1. V. Mohanavel, K. Rajan, K.R. Senthil Kumar "Study on Mechanical properties of AA6351 alloy reinforced with Titanium di-boride (TiB2) composite by in situ casting method " (Trans Tech Publications 2015)
2. S. Thirumalai Kumaran and M. Uthayakumar ": Investigation on the machining studies of

AA6351-SiC-B4C hybrid metal matrix composites" (Int. J. Machining and Machinability of Materials)

3. V. Mohanavel, K. Rajan, S. Arul, P.V. Senthil "Production, Microstructure and Mechanical behavior of AA6351/TiB2 composite synthesized by direct melt reaction method" (: Proceedings 4 (2017) 3315–3324)
4. V.Mohanavel, K.Rajan, P.V.Senthil, S.Arul "Mechanical behaviour of hybrid composite (AA6351+Al2O3+Gr) fabricated by stir casting method" (Materials Today: Proceedings 4 (2017) 3093–3101)
5. Abhishek Kumar, Rahul, Raghunath, Shivam Singh, Manoo Chand "Development and Characterization of AA6351/AL2O3 Metak Matrix Composite Through Stir Casting " (ISSN: 2394-658X).
6. O. Fabela, S. Patil, S. Chintamani, and B. H. Dennis, "Estimation of effective thermal conductivity of porous media utilizing inverse heat transfer analysis on cylindrical configuration," in Volume 8: Heat Transfer and Thermal Engineering, 2017.
7. S. Patil, S. Chintamani, B. H. Dennis, and R. Kumar, "Real time prediction of internal temperature of heat generating bodies using neural network," Therm. Sci. Eng. Prog., vol. 23, no. 100910, p. 100910, 2021.
8. S. Patil, S. Chintamani, J. Grisham, R. Kumar, and B. H. Dennis, "Inverse determination of temperature distribution in partially cooled heat generating cylinder," in Volume 8B: Heat Transfer and Thermal Engineering, 2015.
9. I. Khalifa, H. Abd Al-glil, and M. M. Abbassy, "Mobile hospitalization," International Journal of Computer Applications, vol. 80, no. 13, pp. 18–23, 2013.
10. I. Khalifa, H. Abd Al-glil, and M. M. Abbassy, "Mobile hospitalization for Kidney Transplantation," International Journal of Computer Applications, vol. 92, no. 6, pp. 25–29, 2014.
11. M. M. Abbassy and A. Abo-Alnadr, "Rule-based emotion AI in Arabic Customer Review," International Journal of Advanced Computer Science and Applications, vol. 10, no. 9, 2019.
12. M. M. Abbassy and W. M. Ead, "Intelligent Greenhouse Management System," 2020 6th International Conference on Advanced Computing and Communication Systems (ICACCS), 2020.
13. M. M. Abbassy, "Opinion mining for Arabic customer feedback using machine learning," Journal of Advanced Research in Dynamical and Control Systems, vol. 12, no. SP3, pp. 209–217, 2020.
14. M. M. Abbassy, "The human brain signal detection of Health Information System IN EDSAC: A novel cipher text attribute based encryption with EDSAC distributed storage access control," Journal of Advanced Research in Dynamical and Control Systems, vol. 12, no. SP7, pp. 858–868, 2020.
15. M. M. and S. Mesbah, "Effective e-government and citizens adoption in Egypt," International Journal of Computer Applications, vol. 133, no. 7, pp. 7–13, 2016.
16. M.M.Abbassy, A.A. Mohamed "Mobile Expert System to Detect Liver Disease Kind", International Journal of Computer Applications, vol. 14, no. 5, pp. 320–324, 2016.
17. R. A. Sadek, D. M. Abd-alazeem, and M. M. Abbassy, "A new energy-efficient multi-hop routing protocol for heterogeneous wireless sensor networks," International Journal of Advanced Computer Science and Applications, vol. 12, no. 11, 2021.
18. S. Derindere Köseoğlu, W. M. Ead, and M. M. Abbassy, "Basics of Financial Data Analytics," Financial Data Analytics, pp. 23–57, 2022.

19. W. Ead and M. Abbassy, “Intelligent Systems of Machine Learning Approaches for developing E-services portals,” EAI Endorsed Transactions on Energy Web, p. 167292, 2018.
20. W. M. Ead and M. M. Abbassy, “A general cyber hygiene approach for financial analytical environment,” Financial Data Analytics, pp. 369–384, 2022.
21. W. M. Ead and M. M. Abbassy, “IOT based on plant diseases detection and classification,” 2021 7th International Conference on Advanced Computing and Communication Systems (ICACCS), 2021.
22. W. M. Ead, M. M. Abbassy, and E. El-Abd, “A general framework information loss of utility-based anonymization in Data Publishing,” Turkish Journal of Computer and Mathematics Education, vol. 12, no. 5, pp. 1450–1456, 2021.
23. A. M. El-Kady, M. M. Abbassy, H. H. Ali, and M. F. Ali, “Advancing Diabetic Foot Ulcer Detection Based On Resnet And Gan Integration,” Journal of Theoretical and Applied Information Technology, vol. 102, no. 6, pp. 2258–2268, 2024.
24. M. M. Abbassy and W. M. Ead, “Fog computing-based public e-service application in service-oriented architecture,” International Journal of Cloud Computing, vol. 12, no. 2–4, pp. 163–177, 2023.
25. AbdulKader, H., ElAbd, E., & Ead, W. (2016). Protecting Online Social Networks Profiles by Hiding Sensitive Data Attributes. Procedia Computer Science, 82, 20–27.
26. Fattoh, I. E., Kamal Alsheref, F., Ead, W. M., & Youssef, A. M. (2022). Semantic sentiment classification for covid-19 tweets using universal sentence encoder. Computational Intelligence and Neuroscience, 2022, 1–8.
27. Ead, W. M., Abdel-Wahed, W. F., & Abdul-Kader, H. (2013). Adaptive Fuzzy Classification-Rule Algorithm In Detection Malicious Web Sites From Suspicious URLs. Int. Arab. J. E Technol., 3, 1–9.
28. Abdelazim, M. A., Nasr, M. M., & Ead, W. M. (2020). A survey on classification analysis for cancer genomics: Limitations and novel opportunity in the era of cancer classification and Target Therapies. Annals of Tropical Medicine and Public Health, 23(24).
29. Alsheref, F. K., Fattoh, I. E., & M.Ead, W. (2022). Automated prediction of employee attrition using ensemble model based on machine learning algorithms. Computational Intelligence and Neuroscience, 2022, 1–9.
30. Srinath Venkatesan, “Design an Intrusion Detection System based on Feature Selection Using ML Algorithms”, MSEA, vol. 72, no. 1, pp. 702–710, Feb. 2023
31. Srinath Venkatesan, “Identification Protocol Heterogeneous Systems in Cloud Computing”, MSEA, vol. 72, no. 1, pp. 615–621, Feb. 2023.
32. Cristian Laverde Albarracín, Srinath Venkatesan, Arnaldo Yana Torres, Patricio Yánez-Moretta, Juan Carlos Juarez Vargas, “Exploration on Cloud Computing Techniques and Its Energy Concern”, MSEA, vol. 72, no. 1, pp. 749–758, Feb. 2023.
33. Srinath Venkatesan, “Perspectives and Challenges of Artificial Intelligence Techniques in Commercial Social Networks”Volume 21, No 5 (2023).
34. Srinath Venkatesan, Zubaida Rehman, “The Power Of 5g Networks and Emerging Technology and Innovation: Overcoming Ongoing Century Challenges” Ion exchange and adsorption, Volume 23, Issue 1, 2023.
35. Srinath Venkatesan, “Challenges of Datafication: Theoretical, Training, And Communication Aspects of Artificial Intelligence” Ion exchange and adsorption. Volume 23, Issue 1, 2023.

36. Giovanny Haro-Sosa , Srinath Venkatesan, "Personified Health Care Transitions With Automated Doctor Appointment System: Logistics", Journal of Pharmaceutical Negative Results, pp. 2832–2839, Feb. 2023
37. Srinath Venkatesan, Sandeep Bhatnagar, José Luis Tinajero León, "A Recommender System Based on Matrix Factorization Techniques Using Collaborative Filtering Algorithm", neuroquantology, vol. 21, no. 5, pp. 864-872, march 2023.
38. Srinath Venkatesan, "Utilization of Media Skills and Technology Use Among Students and Educators in The State of New York", Neuroquantology, Vol. 21, No 5, pp. 111-124, (2023).
39. Srinath Venkatesan, Sandeep Bhatnagar, Iván Mesias Hidalgo Cajo, Xavier Leopoldo Gracia Cervantes, "Efficient Public Key Cryptosystem for wireless Network", Neuroquantology, Vol. 21, No 5, pp. 600-606, (2023).
40. Kaur, L., & Shah, S. (2022). Production of bacterial cellulose by Acetobacter tropicalis isolated from decaying apple waste. Asian Journal of Chemistry, 34(2), 453–458.
41. Kaur, L., & Shah, S. (2022). Screening and characterization of cellulose-producing bacterial strains from decaying fruit waste. International Journal of Food and Nutritional Science, 11 (1), 8–14.
42. Verma,S & Kaur,L. . (2018). Identification Of Waste Utilizing Bacteria From Fruit Waste. Global Journal for Research Analysis Volume-7(6, June)
43. Kaur, L., & Singh, N., (2000) Effect of mustard oil and process variables extrusion behavior of rice grits. Journal Of Food Science And Technology. Mysore, 37, 656–660.
44. Thapar, Lakhvinder. (2017). Bulk And Nano-Zinc Oxide Particles Affecting Physio-Morphological Properties Of Pisum Sativum. International Journal Of Research In Engineering And Applied Sciences (IJREAS).
45. Sneha, M., Thapar, L. (2019). Estimation of Protein Intake on the Basis of Urinary Urea Nitrogen in Patients with Non-Alcoholic Fatty Liver. International Journal for Research in Applied Science and Engineering Technology, 7, 2321–9653.
46. Thapar, Lakhvinder. (2017). Fermentation Potential Of Prebiotic Juice Obtained From Natural Sources. International Journal Of Advanced Research. 5. 1779-1785.
47. Mittal, Srishty & Thapar, Lakhvinder. (2019). Vitamin D Levels Between The Tuberculosis Infected And Non – Infected Subjects In 16-25 Years Of Age.
48. T. Khoshtaria, D. Datuashvili and A. Matin, "The impact of brand equity dimensions on university reputation: an empirical study of Georgian higher education," Journal of Marketing for Higher Education, Vol. 30 no 2, pp. 239-255, 2020.
49. T. Khoshtaria, A. Matin, M. Mercan and D. Datuashvili, "The impact of customers' purchasing patterns on their showrooming and webrooming behaviour: an empirical evidence from the Georgian retail sector," International Journal of Electronic Marketing and Retailing, Vol. 12, No. 4, pp. 394-413, 2021.
50. Matin, T. Khoshtaria, M. Marcan, and D Datuashvili, "The roles of hedonistic, utilitarian incentives and government policies affecting customer attitudes and purchase intention towards green products," International Review on Public and Nonprofit Marketing, Vol. 19, pp. 709–735, 2022.
51. Matin, T. Khoshtaria and N Todua, "The Impact of Social Media Influencers on Brand Awareness, Image and Trust in their Sponsored Content: An Empirical Study from Georgian Social Media Users," International Journal of Marketing, Communication and New Media, Vol. 10, No. 18, 2022.
52. Matin, T. Khoshtaria, and G. Tutberidze, "The impact of social media engagement on

consumers' trust and purchase intention," International Journal of Technology Marketing, Vol. 14, No. 3, pp.305 - 323

53. Khoshtaria, T., & Matin, A. "Qualitative investigation into consumer motivations and attitudes towards research shopping in the Georgian market". Administration and Management, Vol 48, pp 41-52, 2019.
54. Awais, M., Bhuva, A., Bhuva, D., Fatima, S., & Sadiq, T. (2023). Optimized DEC: An effective cough detection framework using optimal weighted Features-aided deep Ensemble classifier for COVID-19. Biomedical Signal Processing and Control, 105026.
55. Bhuva, D., & Kumar, S. (2023). Securing space cognitive communication with blockchain. 2023 IEEE Cognitive Communications for Aerospace Applications Workshop (CCAAW). IEEE.
56. Bhuva, D. R., & Kumar, S. (2023). A novel continuous authentication method using biometrics for IOT devices. Internet of Things, 24(100927), 100927.
57. Naeem, A. B., Senapati, B., Islam Sudman, M. S., Bashir, K., & Ahmed, A. E. M. (2023). Intelligent road management system for autonomous, non-autonomous, and VIP vehicles. World Electric Veh. J, 14(9).
58. A. M. Soomro et al., "Constructor development: Predicting object communication errors," in 2023 IEEE International Conference on Emerging Trends in Engineering, Sciences and Technology (ICES&T), 2023.
59. A. M. Soomro et al., "In MANET: An improved hybrid routing approach for disaster management," in 2023 IEEE International Conference on Emerging Trends in Engineering, Sciences and Technology (ICES&T), 2023.
60. B. Senapati and B. S. Rawal, "Adopting a deep learning split-protocol based predictive maintenance management system for industrial manufacturing operations," in Lecture Notes in Computer Science, Singapore: Springer Nature Singapore, 2023, pp. 22–39.
61. Biswaranjan Senapati, B., Rawal, B.S. (2023). Adopting a Deep Learning Split-Protocol Based Predictive Maintenance Management System for Industrial Manufacturing Operations. In: Hsu, CH., Xu, M., Cao, H., Baghban, H., Shawkat Ali, A.B.M. (eds) Big Data Intelligence and Computing. DataCom 2022. Lecture Notes in Computer Science, vol 13864. Springer, Singapore.
62. Sabugaa, M., Senapati, B., Kupriyanov, Y., Danilova, Y., Irgasheva, S., Potekhina, E. (2023). Evaluation of the Prognostic Significance and Accuracy of Screening Tests for Alcohol Dependence Based on the Results of Building a Multilayer Perceptron. In: Silhavy, R., Silhavy, P. (eds) Artificial Intelligence Application in Networks and Systems. CSOC 2023. Lecture Notes in Networks and Systems, vol 724. Springer, Cham.
63. Senapati, B., & Rawal, B. S. (2023). Quantum communication with RLP quantum resistant cryptography in industrial manufacturing. Cyber Security and Applications, 100019, 100019.
64. K. Peddireddy, "Effective Usage of Machine Learning in Aero Engine test data using IoT based data driven predictive analysis," Nternational J. Adv. Res. Comput. Commun. Eng., vol. 12, no. 10, 2023.
65. K. Peddireddy and D. Banga, "Enhancing Customer Experience through Kafka Data Steams for Driven Machine Learning for Complaint Management," International Journal of Computer Trends and Technology, vol. 71, pp. 7–13, 2023.
66. A. Peddireddy and K. Peddireddy, "Next-Gen CRM Sales and Lead Generation with AI," International Journal of Computer Trends and Technology, vol. 71, no. 3, pp. 21–26, 2023.

67. K. Peddireddy, “Kafka-based Architecture in Building Data Lakes for Real-time Data Streams,” International Journal of Computer Applications, vol. 185, no. 9, pp. 1–3, 2023.
68. K. Peddireddy, “Streamlining enterprise data processing, reporting and realtime alerting using Apache Kafka,” in 2023 11th International Symposium on Digital Forensics and Security (ISDFS), 2023.
69. Alsultan,H. A. A. and Awad, K. H.(2021). Sequence Stratigraphy of the Fatha Formation in Shaqlawa Area, Northern Iraq. Iraqi Journal of Science, Vol. 54, no.2F, pp.13-21.
70. Alsultan, H.A.A., Hussein, M.L., Al-Owaidi, M.R.A., Al-Khafaji, A.J. and Menshed, M.A. (2022a). Sequence Stratigraphy and Sedimentary Environment of the Shiranish Formation, Duhok region, Northern Iraq. Iraqi Journal of Science, Vol.63, no.11, pp.4861-4871.
71. Alsultan, H.A.A., Maziqa, F.H.H. and Al-Owaidi, M.R.A. (2022b). A stratigraphic analysis of the Khasib, Tanuma and Sa’di formations in the Majnoon oil field, southern Iraq. Bulletin of the Geological Society of Malaysia, Vol. 73, pp.163 – 169.
72. Mohammed,I.I. and Alsultan,H. A. A.(2022). Facies Analysis and Depositional Environments of the Nahr Umr Formation in Rumaila Oil Field, Southern Iraq. Iraqi Geological Journal, Vol.55, no.2A, pp.79-92.
73. Mohammed, I.I. and Alsultan, H. A. A. (2023). Stratigraphy Analysis of the Nahr Umr Formation in Zubair oil field, Southern Iraq. Iraqi Journal of Science, Vol. 64, no. 6, pp. 2899-2912.
74. M. Farhan, H. Rafi, H. Rafiq, F. Siddiqui, R. Khan, J. Anis, “Study of mental illness in rat model of sodium azide induced oxidative stress,” Journal of Pharmacy and Nutrition Sciences, vol. 9, no. 4, pp. 213–221, 2019.
75. H. Rafi, F. Siddiqui, Anis, R. Khan, H. Rafiq, M. Farhan, “Comparative effectiveness of Agmatine and choline treatment in rats with cognitive impairment induced by AlCl3 and forced swim stress,” Current Clinical Pharmacology, vol. 15, no. 3, pp. 251–264, 2020.
76. H. Rafi, H. Rafiq, and M. Farhan, “Inhibition of NMDA receptors by Agmatine is followed by GABA/glutamate balance in benzodiazepine withdrawal syndrome,” Beni-Suef University Journal of Basic and Applied Sciences, vol. 10, no. 1, pp. 1-13, 2021.
77. H. Rafi, H. Rafiq, and M. Farhan, “Antagonization of monoamine reuptake transporters by agmatine improves anxiolytic and locomotive behaviors commensurate with fluoxetine and methylphenidate,” Beni-Suef University Journal of Basic and Applied Sciences, vol. 10, pp. 1–14, 2021.
78. M. Farhan, H. Rafi, and H. Rafiq, “Dapoxetine treatment leads to attenuation of chronic unpredictable stress induced behavioral deficits in rats model of depression,” Journal of Pharmacy and Nutrition Sciences, vol. 5, no. 4, pp. 222–228, 2015.
79. H. Rafi and M. Farhan, “Dapoxetine: An Innovative Approach in Therapeutic Management in Animal Model of Depression,” Pakistan Journal of Pharmaceutical Sciences, vol. 2, no. 1, pp. 15–22, 2015.
80. H. Rafiq, M. Farhan, H. Rafiq, S. Rehman, M. Arshad, S. Shakeel, “Inhibition of drug induced parkinsonism by chronic supplementation of quercetin in haloperidol-treated wistars,” Pakistan journal of pharmaceutical sciences, vol. 6, no. 35, pp. 1655-1622, 2023.
81. H. Rafi, H. Rafiq, R. Khan, F. Ahmad, J. Anis, M. Farhan, “Neuroethological study of ALCL3 and chronic forced swim stress induced memory and cognitive deficits in albino rats.,” The Journal of Neurobehavioral Sciences, vol. 6, no. 2, pp. 149–158, 2019.
82. M. Farhan, H. Rafi, and H. Rafiq, “Behavioral evidence of neuropsychopharmacological effect of imipramine in animal model of unpredictable stress induced depression”

International Journal of Biology and Biotechnology, vol. 15, no. 22, pp. 213–221, 2018.
83. T. Ghulam, H. Rafi, A. Khan, K. Gul, and M. Z. Yousuf, "Impact of SARS-CoV2 Treatment on Development of Sensorineural Hearing Loss," Proceedings of the Pakistan Academy of Sciences: B. Life and Environmental Sciences., vol. S, no. 58, pp. 45–54, 2021.
84. Akhilesh Kumar Sharma, Gaurav Aggarwal, Sachit Bhardwaj, Prasun Chakrabarti, Tulika Chakrabarti, Jemal Hussain, Siddhartha Bhattarcharyya, Richa Mishra, Anirban Das, Hairulnizam Mahdin, "Classification of Indian Classical Music with Time-Series Matching using Deep Learning", IEEE Access , 9 : 102041-102052 , 2021.
85. Akhilesh Kumar Sharma, Shamik Tiwari, Gaurav Aggarwal, Nitika Goenka, Anil Kumar, Prasun Chakrabarti, Tulika Chakrabarti, Radomir Gono, Zbigniew Leonowicz, Michal Jasiński , "Dermatologist-Level Classification of Skin Cancer Using Cascaded Ensembling of Convolutional Neural Network and Handcrafted Features Based Deep Neural Network", IEEE Access , 10 : 17920-17932, 2022.
86. Abrar Ahmed Chhipa , Vinod Kumar, R. R. Joshi, Prasun Chakrabarti, Michal Jaisinski, Alessandro Burgio, Zbigniew Leonowicz, Elzbieta Jasinska, Rajkumar Soni, Tulika Chakrabarti, "Adaptive Neuro-fuzzy Inference System Based Maximum Power Tracking Controller for Variable Speed WECS", Energies ,14(19) :6275, 2021.
87. Chakrabarti P. , Goswami P.S., "Approach towards realizing resource mining and secured information transfer", International Journal of Computer Science and Network Security, 8(7), pp.345-350, 2008.
88. Chakrabarti P., Choudhury A., Naik N. , Bhunia C.T., "Key generation in the light of mining and fuzzy rule", International Journal of Computer Science and Network Security, 8(9), pp.332-337, 2008.
89. Chakrabarti P., De S.K., Sikdar S.C., "Statistical Quantification of Gain Analysis in Strategic Management" , International Journal of Computer Science and Network Security,9(11), pp.315-318, 2009.
90. Chakrabarti P. , Basu J.K. , Kim T.H., "Business Planning in the light of Neuro-fuzzy and Predictive Forecasting", Communications in Computer and Information Science , 123, pp.283-290, 2010.
91. Prasad A. , Chakrabarti P., "Extending Access Management to maintain audit logs in cloud computing", International Journal of Advanced Computer Science and Applications ,5(3),pp.144-147, 2014.
92. Sharma A.K., Panwar A., Chakrabarti P. ,Viswakarma S., "Categorization of ICMR Using Feature Extraction Strategy and MIR with Ensemble Learning", Procedia Computer Science, 57,pp.686-694,2015.
93. Patidar H. , Chakrabarti P., "A Novel Edge Cover based Graph Coloring Algorithm", International Journal of Advanced Computer Science and Applications , 8(5),pp.279-286,2017.
94. Patidar H., Chakrabarti P., Ghosh A., "Parallel Computing Aspects in Improved Edge Cover based Graph Coloring Algorithm", Indian Journal of Science and Technology ,10(25),pp.1-9,2017.
95. Tiwari M., Chakrabarti P, Chakrabarti T., "Novel work of diagnosis in liver cancer using Tree classifier on liver cancer dataset (BUPA liver disorder)" , Communications in Computer and Information Science , 837, pp.155-160, 2018.
96. Verma K., Srivastava P. , Chakrabarti P., "Exploring structure oriented feature tag weighting algorithm for web documents identification", Communications in Computer and Information

Science ,837, pp.169-180, 2018.
97. Tiwari M., Chakrabarti P , Chakrabarti T., "Performance analysis and error evaluation towards the liver cancer diagnosis using lazy classifiers for ILPD", Communications in Computer and Information Science , 837, pp.161-168,2018.
98. Patidar H. , Chakrabarti P., "A Tree-based Graphs Coloring Algorithm Using Independent Set", Advances in Intelligent Systems and Computing, 714, pp. 537-546, 2019.
99. Chakrabarti P., Satpathy B., Bane S., Chakrabarti T., Chaudhuri N.S. , Siano P., "Business forecasting in the light of statistical approaches and machine learning classifiers", Communications in Computer and Information Science , 1045, pp.13-21, 2019.
100. Shah K., Laxkar P. , Chakrabarti P., "A hypothesis on ideal Artificial Intelligence and associated wrong implications", Advances in Intelligent Systems and Computing, 989, pp.283-294, 2020.
101. Kothi N., Laxkar P. Jain A. , Chakrabarti P., "Ledger based sorting algorithm", Advances in Intelligent Systems and Computing, 989, pp. 37-46, 2020.
102. Chakrabarti P. ,Chakrabarti T., Sharma M . , Atre D, Pai K.B., "Quantification of Thought Analysis of Alcohol-addicted persons and memory loss of patients suffering from stage-4 liver cancer", Advances in Intelligent Systems and Computing, 1053, pp.1099-1105, 2020.
103. Chakrabarti P., Bane S.,Satpathy B.,Goh M, Datta B N , Chakrabarti T., "Compound Poisson Process and its Applications in Business", Lecture Notes in Electrical Engineering, 601, pp.678-685,2020.
104. Chakrabarti P., Chakrabarti T., Satpathy B., SenGupta I . Ware J A., "Analysis of strategic market management in the light of stochastic processes, recurrence relation, Abelian group and expectation", Advances in Artificial Intelligence and Data Engineering, 1133 , pp.701-710, 2020.
105. Priyadarshi N., Bhoi A.K., Sharma A.K., Mallick P.K. , Chakrabarti P., "An efficient fuzzy logic control-based soft computing technique for grid-tied photovoltaic system", Advances in Intelligent Systems and Computing, 1040,pp.131-140,2020.
106. Priyadarshi N., Bhoi A.K., Sahana S.K., Mallick P.K. , Chakrabarti P., Performance enhancement using novel soft computing AFLC approach for PV power system", Advances in Intelligent Systems and Computing, 1040, pp.439-448,2020.
107. Magare A., Lamin M., Chakrabarti P., "Inherent Mapping Analysis of Agile Development Methodology through Design Thinking", Lecture Notes on Data Engineering and Communications Engineering, 52, pp.527-534,2020.
108. Prince, Ananda Shankar Hati , Prasun Chakrabarti , Jemal Hussein , Ng Wee Keong , "Development of Energy Efficient Drive for Ventilation System using Recurrent Neural Network" , Neural Computing and Applications , 33 : 8659 , 2021.
109. Chakrabarti P., Bhuyan B., Chaudhuri A. and Bhunia C.T., "A novel approach towards realizing optimum data transfer and Automatic Variable Key(AVK)" , International Journal of Computer Science and Network Security, 8(5), pp.241-250, 2008.
110. Bayas, E., Kumar, P., & Deshmukh, K. (1869). Review of process parameter's effect on 3D printing. GIS Science Journal, 10(3), 834–845.
111. Bayas, E., Kumar, P., & Harne, M. (2023). Impact of Process Parameters on Mechanical Properties of FDM 3D-Printed Parts: A Comprehensive Review. Eur. Chem. Bull, 12(S5), 708–725.
112. Bayas, Eknath, Kumar, P., & Deshmukh, K. (2023). A comprehensive review:

Process parameters impact on tensile strength of 3D printed PLA parts. International Journal of Advanced Research in Science, Communication and Technology, 3(2) 233–239.
113. E Bayas, P. (2024). Impact of Slicing Software on Geometric Correctness For FDM Additive Manufacturing. International Development Planning Review, 23(1), 704–711.
114. P. M. Natarajan, V. R. Umapathy, A. Murali, and B. Swamikannu, “Computational simulations of identified marine-derived natural bioactive compounds as potential inhibitors of oral cancer,” Future Sci. OA, vol. 8, no. 3, 2022.
115. P. Manickam Natarajan, “Dental Bioinformatics – Current Scope and Future perspectives,” Res. J. Pharm. Technol., pp. 2351–2356, 2022.
116. B. Juala Catherine Jebaraj, P. Birla Bose, R. Manickam Natarajan, and A. Gurusamy, “Perception of dental interns on the impact of their gender during training period and future dental practice-cross sectional survey in dental colleges in Chennai,” India. Journal of Positive School Psychology, vol. 2022, no. 5, pp. 1045–1050.
117. V. R. Umapathy et al., “Emerging biosensors for oral cancer detection and diagnosis—A review unravelling their role in past and present advancements in the field of early diagnosis,” Biosensors (Basel), vol. 12, no. 7, p. 498, 2022.
118. V. R. Umapathy et al., “Current trends and future perspectives on dental nanomaterials – An overview of nanotechnology strategies in dentistry,” J. King Saud Univ. Sci., vol. 34, no. 7, p. 102231, 2022.
119. V. R. Umapathy, P. M. Natarajan, and B. Swamikannu, “Comprehensive review on development of early diagnostics on oral cancer with a special focus on biomarkers,” Appl. Sci. (Basel), vol. 12, no. 10, p. 4926, 2022.
120. V. Rekha U, P. Mn, and Bhuminathan., “Review on Anticancer properties of Piperine in Oral cancer: Therapeutic Perspectives,” Res. J. Pharm. Technol., pp. 3338–3342, 2022.
121. P. Natarajan, V. Rekha, A. Murali, and B. Swamikannu, “Newer congeners of doxycycline – do they hold promise for periodontal therapy?,” Arch. Med. Sci. - Civiliz. Dis., vol. 7, no. 1, pp. 16–23, 2022.
122. B. B. Bose, P. M. Natarajan, A. L. Kannan, J. C. Jebaraj, R. Jagannathan, and T. M. Balaji, “Evaluation of block allograft efficacy in lateral alveolar ridge augmentation,” J. Contemp. Dent. Pract., vol. 23, no. 8, pp. 807–812, 2022.
123. J. Pei et al., “A comprehensive review on bio-based materials for chronic diabetic wounds,” Molecules, vol. 28, no. 2, p. 604, 2023.
124. Shynu T, S. Suman Rajest, R. Regin, & Steffi. R. (2023). Android Application for Remote Control of Personal Computers. International Journal on Orange Technologies, 5(12), 44-58.
125. S. Suman Rajest, R. Regin, Shynu T, & Steffi. R. (2024). Analysis of Sentimental Bias the Implementation of Supervised Machine Learning Algorithms. International Journal of Innovative Analyses and Emerging Technology, 4(1), 8–33.
126. Steffi. R, Shynu T, S. Suman Rajest, & R. Regin. (2024). A Review of the System for Filtering Particulate Matter Affected by Cement Factor. Central Asian Journal of Theoretical and Applied Science, 5(1), 78-93.
127. Regin, R., S. Suman Rajest, Shynu T, and Steffi. R. “Application of Machine Learning to the Detection of Retinal Diseases”. European Journal of Life Safety and Stability, 37(1): 1-23.
128. Shynu T, S. Suman Rajest, R. Regin, & Steffi. R. (2024). Using a Deep Convolutional Neural Network to Identify Vehicle Driver Activity. International Journal on Orange

Technologies, 6(1), 1-19.

129. S. Suman Rajest, R. Regin, Shynu T, & Steffi. R. (2024). A QR Code-Based Real-Time Auditing System for Safe Online Data Storage. International Journal of Human Computing Studies, 6(1), 10-28.

130. Steffi. R, Shynu T, S. Suman Rajest, & R. Regin. (2024). “Monitoring via Video a Deep Convolutional Neural Network for Identifying Wildfires”. International Journal of Innovative Analyses and Emerging Technology, vol. 4, no. 1, pp. 69-83.

131. Shynu T, S. Suman Rajest, R. Regin, & Steffi. R. (2024), “Utilizing Deep Learning Classification Method for the Detection of Potholes. International Journal of Human Computing Studies, 6(1), 29-44.

132. R. Regin, S. Suman Rajest, Shynu T, & Steffi. R. (2024). Recognition of Human Pose Utilizing General Adversarial Networks (GAN) Technologies . European Journal of Life Safety and Stability (2660-9630), 37(1), 30-43.

133. V. R. Umapathy, P. M. Natarajan, and B. Swamikannu, “Review insights on salivary proteomics biomarkers in oral cancer detection and diagnosis,” Molecules, vol. 28, no. 13, p. 5283, 2023.

134. V. R. Umapathy, P. M. Natarajan, and B. Swamikannu, “Review of the role of nanotechnology in overcoming the challenges faced in oral cancer diagnosis and treatment,” Molecules, vol. 28, no. 14, p. 5395, 2023.

135. A. Subba Reddy, S. Kalyani, N. Siva Kumar, V. M. Boddu, and A. Krishnaiah, “Dehydration of 1,4-dioxane by pervaporation using crosslinked calcium alginate- chitosan blend membranes,” Polymer bulletin, vol. 61, no. 6, pp. 779–790, Sep. 2008.

136. A. G. Reddy, Nadavala Siva Kumar, Munagapati Venkata Subbaiah, Madala Suguna, and Abburi Krishnaiah, “Maleic Anhydride Crosslinked Alginate-Chitosan Blend Membranes for Pervaporation of Ethylene Glycol-Water Mixtures,” Journal Of Macromolecular Science, Part A, vol. 46, no. 11, pp. 1069–1077, Oct. 2009.

137. U. Chalapathi et al., “Two-stage-processed AgSbS2 films for thin-film solar cells,” Materials Science in Semiconductor Processing, vol. 168, pp. 107821–107821, Dec. 2023.

138. B. Poornaprakash et al., “Synthesis of highly efficient (Cr, Gd) co-doped CdS quantum dots for photocatalytic H2 evolution beneath artificial solar light irradiation,” Ceramics international, vol. 50, no. 4, pp. 6120–6127, Feb. 2024.