

A

Summer Internship Report at
**“Microwave-Assisted Sintering of Titanium Hydride for
Advanced Dental Implant Applications”**

(IIT KHARAGPUR)

Submitted By :

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Under the guidance of

Dr. Siddharth Tamang (IIT KGP)

in the partial fulfillment for the award of degree of

BACHELOR OF TECHNOLOGY

In

MECHANICAL ENGINEERING



Department of Mechanical Engineering

Guru Ghasidas Vishwavidyalaya

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ACKNOWLEDGEMENT

I Kumar Saurav Suman, student of Guru Ghasidas Vishwavidyalaya, Bilaspur (Chhattisgarh), roll no. 22039127, Branch - Mechanical Engineering and Semester 7. First I would like to thank to Prof. S.P. Anbuudayasankar (HOD) due to which, I get the opportunity to do Summer Internship for 1 month at IIT Kharagpur.

The successful completion of project work requires efforts of several intellectual minds. Working with IIT KGP has been a great learning experience for which I would like to thank everybody who has been instrumental in the completion of my project work.

I wish to express my deep sense of gratitude to my all teaching faculty of IIT KGP for their able guidance and useful suggestions, which helped me in completing the project work, in time.

I would like to give a special thanks to DR. Siddharth Tamang (Associate Prof. , Mechanical Department) of IIT KGP, for providing me the opportunity to do summer training at Indian Institute Of Technology Kharagpur.

I would like to thank IIT institute for organizing and permitting the Summer Internship training program for us.

Thanking You,

Kumar Saurav Suman

Abstract

Titanium hydride (TiH_2) has garnered considerable interest in biomedical applications, especially for dental implants, due to its cost-effectiveness, sinterability, and ability to decompose into fine titanium powder. This report evaluates the synthesis and microwave-assisted sintering of TiH_2 composites for potential dental applications. Employing hybrid microwave sintering (with SiC susceptors), the study outlines a significant reduction in processing time, improved densification, and enhanced mechanical properties. Using advanced characterization methods such as SEM, XRD, and microhardness testing, the report confirms refined grain structures and acceptable mechanical performance suitable for oral environments. The report consolidates experimental data and integrates scholarly insights, proposing a viable and advanced pathway for sintering TiH_2 for dental-grade biomaterials.

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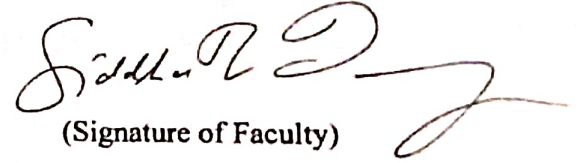
Date: 13/06/2025

To whomsoever it may concern

This is to certify that Mr. KUMAR SAURAV SUMAN has worked with me during the period 14-05-2025 to 13-06-2025. The student has worked in a summer internship topic entitled Studies in "Microwave-Assisted Sintering of Titanium Hydride for Advanced Dental Implant" during the aforesaid period.

I am favourably impressed with the student's diligence, obedience and sincerity towards work assigned to the said student.

The undersigned may be contacted for further information about the intern.



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