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BANARAS HINDU UNIVERSITY

DEPARTMENT OF METALLURGICAL ENGINEERING
Indian Institute of Technology (BHU), Varanasi - 221005
Established by the Institutes of Technology (Amendment) Act. 2012 (No. 34 of 2012)

Phone : 0542-2307080-81, 2369346, **Fax** : 0542-2369478, **email** : head.met@iitbhu.ac.in

Date: 03/04/2024

CERTIFICATE

It is certified that the work contained in the thesis titled **"Structure-property correlations of the heat-treated and friction-stir processed AA7075T7352 alloy"** by **"Roopchand Tandon"** has been carried out under our joint supervision and that this work has not been submitted elsewhere for a degree.

It is further certified that the student has fulfilled all the requirements of Comprehensive, Candidacy and SOTA for the award of Ph.D. degree.

R.K. Mandal 3/4/2024

Prof. R.K. Mandal
(Supervisor)
धातुकीय अभियांत्रिकी विभाग
Department of Metallurgical Engg
Department of Metallurgical Engineering
IIT(BHU), Varanasi U.P. 221005
वाराणसी-221005/Varanasi-221005

R. Manna 3/4/2024

Dr. R. Manna
(Co-supervisor)
सह-आचार्य
Associate Professor
धातुकीय अभियांत्रिकी विभाग
Department of Metallurgical Engg
Department of Metallurgical Engineering
IIT(BHU), Varanasi U.P. 221005
भारतीय प्रौद्योगिकी संस्थान (काशी हिन्दू विश्वविद्यालय)
Indian Institute of Technology (Banaras Hindu University)
वाराणसी-२२१००५/Varanasi-221005

DECLARATION BY THE CANDIDATE

I, **Roopchand Tandon,** certify that the work carried out in the present thesis is my own work carried out under the supervision of **Prof. R.K. Mandal** and **Dr. R. Manna** for the period from July 2017 to March 2024 in the Department of Metallurgical Engineering IIT (BHU), Varanasi. The matter embodied in the thesis has not been submitted for the award of any degree or diploma.

I declare that I have faithfully acknowledged, given credit, and referred to the research workers wherever their work has been cited in the text and the body of the thesis. I further certify that I have not wilfully copied some other's work, paragraph, text, or data, as well as any observations, etc. Further, I haven't included any web data in the current thesis by citing the same as my work.

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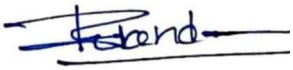

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Phone : 0542-2307080-81, 2369346, **Fax** : 0542-2369478, **email** : head.met@iitbhu.ac.in

Date:03/04/2024

CERTIFICATE BY THE SUPERVISORS

This is to certify that the above statement by the candidate is correct to the best of my /our knowledge.

R.K. Mandal 3/4/2024

Prof. R.K. Mandal
प्राचार्य/Professor
(Supervisor)
धातुकीय अभियांत्रिकी विभाग
Department of Metallurgical Engineering
IIT(BHU), Varanasi-221005
Indian Institute of Technology(Banaras Hindu University)
वाराणसी-221005/Varanasi-221005

Manna 3/4/2024

Dr. R. Manna
सह-आचार्य
Associate Professor
(Co-Supervisor)
धातुकीय अभियांत्रिकी विभाग
Department of Metallurgical Engineering
IIT(BHU), Varanasi-221005
भारतीय प्रौद्योगिकी संस्थान (काशी हिन्दू विश्वविद्यालय)
Indian Institute of Technology (Banaras Hindu University)
वाराणसी-221005/Varanasi-221005

Prof. Sunil Mohan
विभागाध्यक्ष/HEAD
(Head)
धातुकीय अभियांत्रिकी विभाग
Department of Metallurgical Engineering
IIT(BHU), Varanasi-221005
वाराणसी-221005/Varanasi-221005

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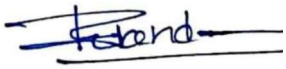

(Roopchand Tandon)

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Roopchand Tandon

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List of Symbols

ºC Degree centigrade

μm Micrometer

nm Nanometre

α Alpha

θ Theta

Wt% Weight percent

kHz Kilo Hertz

mHz Mili Hertz

mg Milli gram

mm Milli meter

ml Mili liter

t Time (h)

A Area (cm^2)

a, b, c Lattice parameters

D (Å) Average crystallite size (in angstrom**)**

$\mathbf{D_{av}}$ Average grain size

cm Centimetre

hrs Hours

S Second

≥ Greater than

≤ Less than

b Burger vector

λ Wavelength

ε Lattice micro-strain

β Beta

η Eta

η' Eta prime

MPa Mega Pascal

H_v Hardness in Vickers scale

T_r Transition strain

ν Poison's ratio

E Youngs Modulus

G Shear Modulus

HAGBF = High-angle grain boundary fractions

LAGBF = Low-angle grain boundary fractions

Abbreviations

ASTM	American Society for Testing and Materials
EBSD	Electron Back Scattered Diffraction
EDS	Energy Dispersive Spectroscopy
FCC	Face Centred Cubic
FESEM	Field Emission Scanning Electron Microscope
GP zone	Guinier Preston Zone
HAADF	High Angle Annular Dark Field
HCP	Hexagonal Close Packing
HRTEM	High-Resolution Transmission Electron Microscope
FFT	Fast Fourier Transform
FSP	Friction Stir Processing
RPM	Rotation Per Minutes
SAEDPs	Selected Area Electron Diffraction Patterns
SCC	Stress Corrosion Cracking
TEM	Transmission Electron Microscope
STEM	Scanning Transmission Electron Microscope
XRD	X-ray Diffractometer
WB	Weak Beam
WBDF	Weak Beam Dark Field
HR- XRD	High-Resolution X-Ray Diffractometer

OIM	Orientation Imaging Microscopy
FSP	Friction Stir Processing
FSPed	Friction Stir Processed
KAM	Kernel Average Mis-orientation
CSL	Co-incidence Site Lattice
EBSD	Electron Back Scattered Diffraction
ODF	Orientation Distribution Function
GND	Geometrically Necessary Dislocation
DRx	Dynamic Re-crystallization
CDRx	Continuous Dynamic Re-crystallization