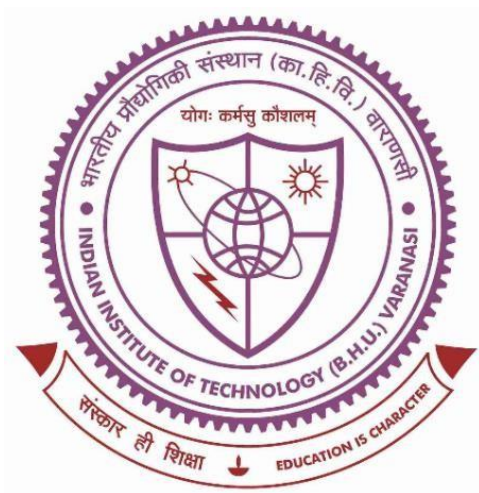


Development of refractory element based complex concentrated alloys for biomedical applications



Thesis submitted in partial fulfillment for the Award of Degree

Doctor of Philosophy

By

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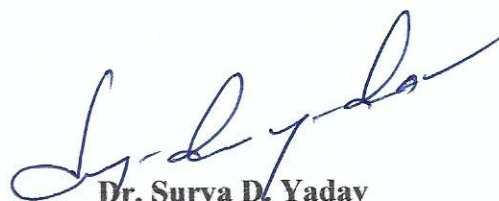
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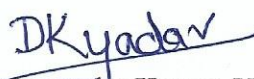
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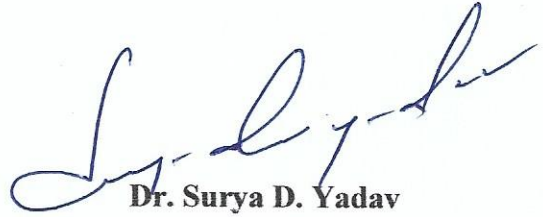
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Abbreviations

AFM	A tom i c F orce M icroscopy
AR	A s R eceived
ASTM	A merican S ociety for T esting and M aterials
BCC	B ody C entered C ubic
CCA	C omplex C oncentrated A lloy
COF	C oefficient O f F riction
CPE	C onstant P hase E lement
cp-Ti	C ommer c ially P ure T itanium
CR	C orrosion R ate
DMEM	D ulbecco's M odified E agle M edium
EBSD	E lectron B ack S cattered D iffraction
EDS/EDX	E nergy D ispersive X -ray S pectroscopy
EIS	E lectrochemical I mpedance S pectroscopy
FBS	F etal B ovine S erum
FCC	F ace C entered C ubic
FESEM	F ield E mission S canning E lectron M icroscopy
HCP	H exagonal C losed P acking
HEA	H igh E ntropy A lloy
HEI	H igh E ntropy I ntermetallics
HPT	H igh P ressure T orsion
IPF	I nverse P ole F igure
MEM	M inimum E ssential M edium

MPEA	M ulti P rincipal E lement A lloy
MTT	3-(4,5-Di- M ethyl- T hiazol-2-yl)-2,5-Diphenyl T etrazolium bromide
NCCS	N ational C entre for C ell S cience
OCP	O pen C ircuit P otential
ODF	O rientation D istribution F unction
OM	O ptical M icroscopy
PD	P otential D ynamic
ROS	R eactive O xygen S pecies
SAED	S electd A rea E lectron D iffraction
SBF	S imulated B ody F luid
SEM	S canning E lectron M icroscopy
SPD	S evere P lastic D eformation
SS	S tainless S teel
SWR	S pecific W ear R ate
TEM	T ransmission E lectron M icroscopy
VAM	V acuum A rc M elting
VEC	V alence E lectron C oncentration
XRD	X - R ay D iffraction

SYMBOLS

a	Lattice parameter
ρ	Density
σ	Sigma
λ	Wavelength
ν	Poisson's Ratio
°C	Degree Centigrade
K	Kelvin
E	Elastic Modulus
R	Ideal Gas Constant
N	Newton
Pa	Pascal
MPa	Mega Pascal
GPa	Giga Pascal
μm	Micrometer
nm	Nanometer
Å	Angstrom
θ	Theta
δ	Delta
Ω	Omega
at. %	Atomic Percent
wt. %	Weight Percent
ml	Milliliter

J	Joule
R_q	root mean square roughness
R_{sk}	skewness
R_{ku}	kurtosis
mm	Millimeter
gm	Gram
χ	Chi
min	Minute
s	Second
I_{corr}	Corrosion Current Density
V_{corr}	Corrosion Potential