

26TH FEBRUARY 2023 (SUNDAY)

Welcome and Registration – 4.30 to 6.30 pm

J N Tata Auditorium

27TH FEBRUARY 2023 (MONDAY)

Inauguration: 09:15-09:45 am (Main Hall, J N Tata Auditorium)

About conf. Talk 1	09:45-10:15 am	Expert Talk on Proceedings of NanoSPD by Ruslan Z Valiev		
Chair: Leo A. I. Kestens				
Plenary 1 (Main Hall)	10:15-10:50 am	Valery I Levitas <i>Recent in situ experimental and theoretical advances in severe plastic deformations, strain-induced phase transformations, and nanostructure evolution under high pressure</i>		
Plenary 2 (Main Hall)	10:50-11:25 am	Boris Straumal <i>Phase transitions driven by the high-pressure torsion in the binary Ti alloys H22</i>		
Coffee Break: 11.25-11.50 am				
		Main Hall Chair: Werner Skrotzki	Hall - A Chair: Subodh Kumar	Hall - B Chair: R. S. Mishra
Invited (1-3)	11:50-12:20 pm	Laszlo S Toth <i>The basic mechanics of severe plastic deformation processes</i>	H-G Brokmeier <i>In-situ grain refinement down to nano scale by co-deformation of metals such as Cu-Nb extrusion</i>	David P Field <i>Development and analysis of heterogeneous SPD microstructures</i>
Invited (4-6)	12:20-12:50 pm	Nilesh P Gurao <i>Effect of initial texture on high pressure torsion induced omega phase transformation in commercially pure titanium</i>	Apu Sarkar <i>Severe plastic deformation of Nb-1Zr alloy: Effect of annealing on microstructure and mechanical properties</i>	Stuart Wright <i>Spherical indexing of electron back-scattered diffraction patterns in highly deformed materials</i>
Lunch: 12.50 – 02.00 pm				
Chair: Kamanio Chattopadhyay				
Plenary 3 (Main Hall)	02:00-02:35 pm	Andrea Bachmaier <i>Magnetic materials by severe plastic deformation</i>		
Plenary 4 (Main Hall)	02:35-03:10 pm	Rimma Lapovok <i>Design of SPD - Made Hybrid Materials for Energy Applications</i>		
		Main Hall Chair: H.S. Kim	Hall - A Chair: Vikram Jayaram	Hall - B Chair: Ashok M Raichur
Invited (7-9)	03:10-03:40 pm	Yuntian Zhu <i>Plastic deformation processing of heterostructured materials: An overview</i>	James Mann <i>Single step production of large scale foil, sheet and wire by shear based deformation processing</i>	Kaveh Edalati <i>From functional nanomaterials to the origin of life by high pressure torsion</i>

Invited (10-12)	03:40-04:10 pm	Ruslan Valiev <i>Designing nanoSPD materials for their multifunctional properties</i>	K Trumble <i>The cutting of gummy metals</i>	Kaushik Chatterjee <i>Surface severe plastic deformation to enhance the biomedical performance of orthopaedic biomaterials</i>
Coffee break: 4.10 – 4.30 pm				
Invited (13-15)	04:30-05:00 pm	R Manna <i>Microstructure and mechanical properties of ultrafine-grained materials</i>	Rajeev Kapoor <i>Achieving high strength ultra-fine grained austenitic stainless steels by the process of reversion of strain induced martensite</i>	T S Sampath Kumar <i>Nanostructured metallic implants with enhanced bio-functionalization</i>
Oral	05:00-05:20 pm	Nagamani Jaya Balila <i>Deformation and fracture micro-mechanisms in HPT processed maraging steels</i>	Shabnam Taheriniya <i>Phase transition overview in the nanocomposite high entropy alloy produced by high pressure torsion</i>	N Ramesh Babu <i>Biomimetic PEO coatings for implants made of nanostructured titanium alloys</i>
Oral	05:20-05:40 pm	M Ravi Shankar <i>Confinement of low dimensionality unlocks severe plastic deformability in Mg alloys</i>	Tatsuya Sugihara <i>Direct observation of large-strain deformation at contact interface in wedge indentation of aluminium</i>	Sabavath Janakiram <i>An in-situ TEM study on restoration mechanisms during low-temperature annealing of 80% cold rolled ferrite-pearlite AHSS steels</i>
28TH FEBRUARY 2023 (TUESDAY)				
Chair: Atul Chokshi				
Plenary 5 (Main Hall)	09:15-09:50 am	Jae-il Jang <i>Nanoindentation and novel structural materials development</i>		
Plenary 6 (Main Hall)	09:50-10:25 am	Werner Skrotzki <i>Mechanisms of Nanoplasticity</i>		
		Main Hall Chair: Andrea Bachmaier Co-chair: Piyush Jagtap	Hall - A Chair: Jae-il Jang Co-chair: Somjeet Biswas	Hall - B Chair: Satish V. Kailas Co-Chair: Rajeev Kapoor
Invited (16-18)	10:25-10:55 am	Hyoung Seop Kim <i>Cold sintering of high entropy alloy powders using HPT</i>	Arun Prakash <i>Atomistic simulations of idealized equal channel angular pressing process</i>	Rajiv S Mishra <i>Friction-stir processing of thermally stable nanostructured immiscible alloys and metastable high entropy alloys</i>
Invited (19-21)	10:55-11:25 am	Karsten Durst <i>Solid solution effects on structure evolution and mechanical properties of nanostructured binary (Cu-X) and high entropy alloys (Cantor-Ni) after high pressure torsion</i>	Udaya Bhat <i>Effect of process parameters during ECAP on microstructure and mechanical properties improvement in case Al-Zn-Mg alloy</i>	Arockia Kumar Raju <i>Friction stir processing: a tool to develop functional material</i>
Coffee Break: 11.25-11.40 am				
Oral	11:40-12:00 pm	Praveen Sathiyamoorthi <i>Superplastic behaviour of high-pressure torsion processed high entropy alloys</i>	Sumeet Mishra <i>Superposition of strengthening mechanisms: A statistical approach based on circle rolling</i>	Nitish Raja <i>Microstructural response of FSPed Al-7.3Zn-2.2Mg-2Cu (Al7068) alloy</i>

Oral	12:00-12:20 pm	Niraj Chawake <i>HPT studies on FCC medium entropy alloys and understanding the role of GSFE on their deformation behavior</i>	Anish Karmakar <i>Influence of equal channel angular rolling (ECAR) on the gradual microstructural evolution in Al-4.5Mg-0.14Si alloy</i>	Abhishek Tripathi <i>Texture and Microstructure developments during multipass friction stir processing of Magnesium Alloy AZ31</i>
Oral	12:20-12:40 pm	Surya Nilamegam Kumaran <i>Texture prediction of severely deformed high-entropy alloy by crystal plasticity simulations</i>	Raj Bahadur Singh <i>Deformation of Inconel 800 through equal channel angular pressing</i>	Vasanth Chakravarthy Shunmugasamy <i>Preparation of ultra-thin walled magnesium AZ31 alloy tubes using friction stir extrusion</i>
Oral	12:40-1:00 pm	Piotr Bazarnik <i>Effects of aluminum purity and addition of carbon nanotubes on the hardness and thermal stability of CNT reinforced aluminum nanocomposites processed by the high-pressure torsion technique</i>	Dmitrii Panov <i>Effect of swaging and following annealing on gradient structure formation in austenitic stainless steels with various stacking fault energy</i>	Harpreet Singh Arora <i>Nano-tubular architecture through severe physical deformation for high performance supercapacitor</i>
Lunch: 1.00-2.00 pm				
Chair: Gerhard Wilde				
Plenary 7 (Main Hall)	2:00-2:35 pm	Leo Kestens <i>Texture control in SPD processed alloys by (dynamic) high-pressure torsion and accumulative roll bonding</i>		
Plenary 8 (Main Hall)	2:35-3:10 pm	Julia Ivanisenko <i>Scaling-up of Severe Plastic Deformation –a Story of Success without a Happy-end</i>		
Poster Session and High Tea: 3.10-5.30 pm				
BANQUET AT GOKULAM GRAND: 07.00 – 9:30 pm				
1ST MARCH 2023 (WEDNESDAY): EXCURSION-MYSORE				
2ND MARCH 2023 (THURSDAY)				
Chair: Julia Ivanisenko				
Plenary 9 (Main Hall)	09:15-09:50 am	Atul H Chokshi <i>The Zen of Grain Boundaries</i>		
Plenary 10 (Main Hall)	09:50-10:25 am	Sergiy Divinski <i>'Non-equilibrium' grain boundaries in additively manufactured alloys: CoCrFeMnNi high-entropy alloy as a case study</i>		
		Main Hall Chair: Kaveh Edalati Co-Chair: Chandan Srivastava	Hall - A Chair: Laszlo S. Toth Co-Chair: S. Sankaran	Hall - B Chair: S. Chandrasekhar Co-Chair: Prosenjit Das
Invited (22-24)	10:25-10:55 am	Gerhard Wilde <i>Impact of structural transformations and defect interactions at grain boundaries in nanocrystalline metallic materials</i>	Pradipta Ghosh <i>Origin of anisotropic mechanical behaviour of high-pressure torsion deformed metals and alloys</i>	Vivek Pancholi <i>Microstructural characterization of friction-stir processed green Al powder compact</i>

Oral	10:55-11:15 am	Roman Karelin Low-temperature processing of NiTi shape memory alloy by ECAP in shells	Soumita Mondal <i>Investigation on the effect of high pressure torsion on the Precipitates in Sc modified Al–Li alloy</i>	Ajay Kumar <i>Friction-stir processing of squeeze cast A356 with surface compacted graphene nanoplatelets (GNPs) for the synthesis of metal matrix composites</i>
Coffee Break: 11.15-11.30 am				
Invited (25-27)	11:30-12:00 pm	Somjeet Biswas <i>Twin induced compressive strain hardening behaviour in titanium</i>	R Jayaganthan <i>Mechanical properties and microstructural evolution of Zr-4 alloy processed through rotary swaging</i>	K S Suresh <i>Origin of grain size stability in friction stir processed Al powder compact</i>
Oral	12:00-12:20 pm	Simon Pillmeier <i>Fatigue crack growth behavior of a nanocrystalline deformed Ti Nb alloy</i>	G Bharat Reddy <i>Producing hierarchical nano-twins in Zr alloys through multi-axial cryo forging for strength ductility enhancement</i>	Arockia Kumar Raju <i>Friction stir processing of Zn-Mg biodegradable alloys</i>
Oral	12:20-12:40 pm	Kausik Chattopadhyay <i>Corrosion and low cycle fatigue behaviour of ultrasonic shot peened Ti 13Nb 13Zr alloy</i>	Swati Mahato <i>Development of metastable dual-phase ternary medium entropy alloy using cryorolling technique</i>	Máté Szűcs <i>Metal bonding by Friction-Assisted Lateral Extrusion Process (FALEP) at room temperature</i>
Oral	12:40-1:00 pm	Sandeep Sahu <i>Microstructure and corrosion behaviour of additive manufactured AlSi10Mg alloy processed by HPT</i>	Krishan Kumar Pandey <i>In situ experimental studies of plastic strain induced $\alpha \rightarrow \omega$ phase transitions in ultra-pure Zr and Zr2.5Nb alloy</i>	Shivram Thapliyal <i>Underwater friction stir welding route for developing hybrid joints of aluminum and polymer of dissimilar thickness</i>
Lunch: 1.00-2.00 pm				
Online Talks (Main Hall)				
Chair: Praveen Kumar				
Online Talk	02:00-02:30 pm	Nobuhiro Tsuji <i>Nucleation of New Deformation Modes in Fully Annealed Nanostructured Metals</i>		
Online Talk	02:30-03:00 pm	Zenji Horita <i>In Situ Synchrotron X-ray Analysis for Allotropic Transformation of ZnO processed by SPD</i>		
Online Talk	03:00-03:20 pm	Borisovich Naimark <i>On thermodynamics of nanostructured state and mechanical properties of NanoSPD materials in wide range of load intensity</i>		
Online Talk	03:20-03:40 pm	Nariman Enikeev <i>Under water friction stir welding route for developing hybrid joints of Al and polymer of dissimilar thickness</i>		
Coffee Break: 3.40-4.00 pm				
Presentation by Sponsors (Main Hall): 4:00 – 5:20 PM				
Chair: Surendra K. Makineni				
High Tea: 5:20 – 6:00 PM				
CULTURAL PROGRAM (Main Hall): 6:00-7:00 pm				

3RD MARCH 2023 (FRIDAY)

		Main Hall Chair: M.J.N.V. Prasad Co-Chair: Ankur Chauhan	Hall – A Chair: Sergiy V. Divinski Co-chair: B S S Daniel	Hall – B Chair: Borris Stramual Co-chair: Nilesh P. Gurao
Invited (31-33)	09:15-09:45 am	Uday Chakkingal <i>Improvement in formability of Ti and Mg alloys by equal channel angular pressing</i>	Rama Krishna Sabat <i>Ductility enhancement in Mg-0.2%Ce alloys</i>	Megumi Kawasaki <i>In-situ heating neutron diffraction analysis of structural relaxation in additive-manufactured 316L stainless steel</i>
Invited (33-36)	09:45-10:15 am	Shashank Shekhar <i>Redesigning constrained groove pressing technique to overcome strength-ductility limitations</i>	B S S Daniel <i>Dynamic working and mechanical property of homogenised AA7068</i>	Venkateswarlu K <i>The Influence of SPD process on 3-D printed Al-10 Si-0.5 Mg alloy</i>
Invited (37)	10:15-10:45 am	S K Panigrahi <i>Investigation into microforming capabilities of engineered UFG Al and Mg alloys</i>	Oral (10:15-10:35) Debdas Roy <i>Improvement in mechanical and electrical properties of Cu-graphene nanocomposites prepared by high pressure sintering</i>	Oral (10:15-10:35) Dan Sathiaraj <i>Surface severe plastic deformation of wire arc additive manufactured pure copper</i>
Oral	10:45-11:05 am	Devinder Yadav <i>Friction surfacing: A new way to repair surface cracks</i>	Bheemreddy Prathyusha <i>A novel manufacturing method to develop ultra-fine grained Al/Cu bimetals</i>	Prakash Chandra Gautam <i>Effect of ECAP routes on microstructure, texture, and mechanical properties evolution in pure magnesium</i>
Coffee Break: 11.05-11.20 am				
Invited (38-40)	11:20-11:50 am	V Subramanya Sarma <i>Effect of strain rate on the retained austenite stability in a Medium-Mn steel</i>	S Sankaran <i>Thermal stability of microstructure and texture in UFG Al-Mg-Sc-Zr alloys processed through severe cold rolling and annealing</i>	M J N V Prasad <i>Development of gradient metallic materials and coatings by electrodeposition: A strategic approach to improve the resistance to mechanical degradation</i>
Oral	11:50-12:10 pm	Prakash G Ranaware <i>Investigation of effect of severe plastic deformation on laser transformation hardening of low carbon low alloy steel</i>	Esakkiraja Neelamegan <i>Interdiffusion behavior in a severely deformed Cu Ni diffusion couple</i>	Yagnesh Shadangi <i>Surface nanostructuring and thermal stability of IN718 superalloy treated by ultra-shot peening</i>
Oral	12:10-12:30 pm	Saurav Sunil <i>Mechanical behaviour of ultrafine grained SS304L produced by reversion of strain induced martensite formed by severe plastic deformation</i>	Shavi Agrawal <i>Evolution of microstructure and mechanical properties of 2099 aluminium alloy deformed by high-pressure torsion</i>	Balkrishna C Rao <i>Ultra-fine-grained foils from extrusion machining of a nickel-based super alloy</i>
Oral	12:30-12:50 pm	B Aashranth <i>Severe plastic deformation of a lath martensitic steel: exploring the microstructural origins of exceptional strengthening</i>	Girish Bojjawar <i>Influence of Co content on the simultaneous enhancement of strength and ductility in severely drawn textured Ni-Co microwires</i>	Manoel Kasalo <i>Mechanical and tribological performance of severe plastically deformed Ni base super alloy composites</i>
Oral	12:50-01:10 pm	Chavan Akash Naik	Malgorzata Lewandowska	Abheepsit Raturi

		<i>Structure-property correlations at a micro-meter length scale of hot rolled and cold rolled dual phase steels</i>	<i>Ductility and formability of ultrafine-grained aluminium plates</i>	<i>Microstructure and microtexture development of non-equiatomic Mo-Nb-Ta-V-W refractory HEA during HPT at 473K</i>
Lunch: 1.10-2.00 pm				
	Time	Main Hall Chair: Uday Chakkingal Co-Chair: Abhik N. Chowdhury	Hall – A Chair: Megumi Kawasaki Co-Chair: Sachin Rondiya	Hall – B Chair: Reema Lapovok Co-Chair: Bhagwati Prasad
Invited (41-43)	02:00-02:30 pm	Koteswararao V Rajulapati <i>Mechanical response of multi-phase nanostructured high-entropy alloys prepared by different severe plastic deformation methods</i>	Koushik Viswanathan <i>A robust in-situ technique for evaluating sub-surface plastic strains</i>	Satish V Kailas <i>Polymer derived ceramic metal matrix composites; High strength, High Ductility, High temperature grain stability</i>
Oral	02:30-02:50 pm	Narayan K Sundaram <i>Modelling and simulation of large strain complex plastic flows in polycrystalline aggregates</i>	Saeid Akrami <i>CO₂ photo-reduction using high-pressure TiO₂-II synthesized by high-pressure torsion (HPT)</i>	Lukas Weissitsch <i>Bulk rare earth free permanent magnets by severe plastic deformation and advanced annealing procedures</i>
Oral	02:50-03:10 pm	Anup Basak <i>Grain boundary- induced martensitic nanostructures in bicrystals and tricrystals - Large strains-based phase-field study</i>	Parisa Edalati <i>Using the high-pressure torsion (HPT) to fabricate a high-entropy oxynitride for photocatalytic H₂ evolution</i>	Franziska Staab <i>Hard magnetic SmCo₅-Cu nanocomposites produced by HPT</i>
Oral	03:10-03:30 pm	Jacqueline Hidalgo Jimenez <i>High-pressure columbite as an active photocatalyst: Ab initio calculations and experiments by high-pressure torsion</i>	Anshul Gupta <i>Enhanced hydrogen storage in Mg catalysed by CuNiCoFe_{0.9}Pd_{0.1} multi-component alloy</i>	Alexander Paulischin <i>Influence of severe plastic deformation on the magnetic properties of SmCo permanent magnets</i>
Coffee Break: 3.30-3.45 pm				
Oral	03:45-04:05 pm	Victor Komarov <i>Study of the deformation behaviour, structure formation, and properties of titanium nickelide subjected to severe plastic torsion deformation</i>	Govind Kumar <i>Control of mechanical properties in commercially pure aluminium by a newly developed severe shear plastic deformation technique</i>	K Chandra Sekhar <i>Induction of magnetic saturation in the non-magnetic austenitic stainless steels by trapezoidal notch wavy rolling SPD</i>
Oral	04:05-04:25 pm	Fedor Vodolazskiy <i>Structure refinement and property evolution of the Ti-3Al-2.5V alloy during tube producing by the TREX technology</i>	Sanika Paranjape <i>Simultaneous improvement in Strength and Ductility in deformed pure magnesium</i>	Sunil Kumar <i>Recent advancements in constrained Groove pressing process</i>
Oral	04:25-04:45 pm	Elias C. Aifantis (Pre-recorded Talk) <i>Revisiting the classical laws for nanomechanics</i>	Timur B. Minasov (Pre-recorded Talk) <i>In vivo osseointegration of nanotitanium implants</i>	A Krishnaiah <i>Investigations on performance of EDM by modified copper electrodes with relief angle and corner radius</i>
Concluding session or Valedictory function from 04.45-05.00 pm High Tea 05.00 pm onwards				

List of Posters

Poster No.	Name	Title
1	Lochan Upadhayay	Effect of High-Pressure Torsion on Mechanical and Corrosion Properties of a Biomedical Mg-6Zn-0.2Ce Alloy
2	Saurish Sahay	Effect of high pressure torsion on the microstructure, mechanical, corrosion and biological properties of β Ti-34Nb-3Zr-2Ta alloy for orthopedic implant application
3	Bhawna Yadav	Phase stability of Al _x CoCrNi medium entropy alloys processed by high pressure torsion
4	Gyan Shankar	X-ray line profile analysis of nanostructured Cu-Al and Cu-Al-Co alloys processed through high-pressure torsion
5	Pratap Singh	Microstructure, mechanical and surface characterization of SiO ₂ and Al ₂ O ₃ reinforced Al 6061 surface nanocomposites using friction stir processing
6	Kuldeep Singh	Comparative study of concurrent microstructure evolution and mechanical properties in friction stir processing and high pressure torsion of Al-Si Alloys
7	Roopchand Tandon	Phase transformation microstructure evolution texture characteristics and mechanical properties of multi-pass friction stir processed AA7075T7352
8	K. Venkateswara Reddy	Effect of friction stir processing on microstructural and damping properties of Al6061/BN surface composites
9	Manish Nandkumar Borse	Microstructural characterization of friction stir welded Al-Zn-Mg cast alloy for Automotive Applications
10	Shivraman Thapliyal	Work hardening and wear behavior of Friction stir processed Ni-Al bronze (NAB) alloy
11	Honey Rakesh Gupta	Ultra-fine-grained medium Mn low Ni austenitic stainless steel by thermomechanical processing routes
12	Jagadeesh Neduri	Role of severe plastic deformation on the electrochemical behavior of austenitic stainless steel
13	Gaurav Pandey	Microstructure, Texture, and mechanical property correlation in cold rolled DP-steel during inter-critical annealing
14	Achintya Kumar Patra	Effect of strain rate on the staircase-type strain hardening behavior in an ultra-fine-grained medium-Mn steel
15	Bikash Tripathy	Nano structure control for improving tensile properties of cost effective AlCrFe 2 Ni 2 high entropy alloy
16	Krishna Jeevanaboina	Microstructure assisted strengthening of NiCoCr based medium entropy alloys with the addition of Al and Ti
17	Deekshith G. Kalali	Structure property correlations in fine grained medium entropy alloys prepared by mechanical alloying and spark plasma sintering
18	Shubham Sharma	Hot deformation behavior of CoCrFeMnNi High Entropy Alloy: Physical Simulation and Processing Map
19	Rajeshwar R. Eleti	The origins of ultrafine grain refinement during hot deformation of body-centered cubic high-entropy alloys without severe plastic deformation
20	Bhanu Pratap Singh	Finite element assisted self-consistent simulations to capture barreling and texture heterogeneity during hot compression and its subsequent effect on rolling and recrystallization texture
21	Purnima Bharti	Modelling the effect of predeformation on precipitation kinetics of AA2195 alloy

22	Shirish Chandrakar	A full field crystal plasticity simulation study on the propensity of grain fragmentation in copper for strain path change in shear
23	Deepak Paliwal	An experimental and crystal plasticity simulation study to explain optimum strength ductility combination in gradient microstructure copper samples produced by surface mechanical grinding treatment
24	Arunabha Datta	Validation of Thermomechanical Model for Stress Relaxation in Superelastic Shape Memory Wire using Experimental Observation
25	Neha Garg	Influence of Co content on the simultaneous enhancement of strength and ductility in severely drawn textured Ni-Co microwires
26	Jyoti Ranjan Sahoo	A comprehensive study on the implications of cluster characteristics on work hardening, strain rate sensitivity, formability and paint-response of AA 6082 sheets
27	Surajit Samanta	A new physical based framework capturing the role of dynamic strain aging on work hardening behavior of an Al-Mg alloy
28	Aman Jyoti Shukla	Microstructure and texture evolution during uniaxial compression of Mg-Zn-Ca alloy
29	Muhammad Imtiaz Hussain	Effect of grain size gradient on mechanical properties of FSPed AZ91
30	Rajan Kushwaha	Understanding the micromechanics of precipitation distribution in WE43 alloy using Nye tensor
31	Shabanov Maxim	Fabrication nanostructure during the heat treatment of Ti ₂ AlNb intermetallic
32	Tapas Pal	Development of Al ₃ BC reinforced novel in-situ Al-based metal matrix composites via warm-extrusion
33	Yogesh prabhu	Crystallization kinetics on melt spun and HPT processed Zr ₆₂ Cu ₂₂ Al ₁₀ Fe ₅ Dy ₁ metallic glass
34	A. Kedharnath	Comparison of multi-axial forging of Ta and Ta-10wt% W
35	Diksha Mahadule	Effect of initial grain size on Recrystallization texture of cold rolled Ti-15V-3Al-3Cr-3Sn Beta Titanium Alloy
36	Leonie Frohnapfel	Plastic Flow in Small Cavities of Nanocrystalline CuZn ₃₀ Introduced by Nanoimprinting
37	Ruslan Valiev	Effect of B addition on the P hase Transformation and Mechanical Behavior of Nanocrystalline Ti Fe Alloy