Binay Kumar Deb Barman

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Area of Interest:

- Mechanical Behaviour of Materials, Physical Metallurgy, Materials Processing, FEM modelling on structural analysis with ANSYS, ABAQUS, Electron Microscopy.

Technical skills

- Well versed with mechanical testing (tensile/compression behaviour, creep) and data analysis
- Expertise in SEM, optical microscopy, EDS and XRD
- Expertise in powder metallurgy, accumulative roll bonding and maintenance of vacuum system
- Skilled user of DSC, TGA
- Modelling software: ANSYS, ABAQUS, OOF2 and COMSOL Multiphysics
- Computer proficiency: C, MS Office

Education:

Degree	Board/University	Period		Specialization	CGPA
		From	To		
M.E.	Indian Institute of Science	2012	Present	Materials Engineering	6.8/8
B.E.	Bengal Engineering and Science University	2008	2012	Metallurgy and Materials Engineering	8.4/10

Relevant courses at IISc with grades:

Mechanical Behaviour of Materials (S), Structure and Characterization of Materials (S), Thermodynamics and Kinetics (A), Science of Materials Processing (A), Electron Microscopy in Materials Characterization (A), Corrosion Technology (A), Finite Element Analysis (B)

M.E. Project:

Title: "Mechanical behaviour of two phase system with one liquid phase and development of thermal surge protector with energy storage capacity"
Supervisor: Dr. Praveen Kumar

A latent heat storage system using phase change materials (PCMs) is an effective way of storing thermal energy as well as thermal surge protection. Liquid phase sintered (LPS) metallic composites with a low melting phase coupled with a high melting phase can be attractive materials for thermal energy storage, where the latent heat absorbed by the lower melting phases upon melting can be stored for later retrieval and/or conversion to other forms of energy. It can be used as surge protector device by absorbing excessive heat due to sudden rise in temperature in circuit current/voltage and hence protects the valuable components in the circuit from getting burned or damaged.

Experiments and Characterization technique involved:

- Compression tests at varying temperatures below and above the melting point of low melting phase at varying strain rate (mechanical reliability of the system)
- Creep test at varying temperature and at different constant loads to determine service period of surge protector device.

- Microstructural analysis using SEM, EDS, EBDS and XRD for structure-property correlation
- DSC analysis to calculate the amount of heat absorbed per unit volume of the materials.
- Modelling with ANSYS, OOF2 and ABAQUS to understand the effect of microstructure and loading condition on stress/strain-field.

B.Tech Project:

Title: "Structure and properties of transient liquid phase bonding between Stainless Steel and Ti-Nb-Al alloy using Cu-Ag base interlayer"
Supervisor: Prof. Sukumar Kundu

Stainless steel and Titanium alloys were bonded by transient liquid phase bonding using Cu-Ag interlayer at different temperatures and pressures. Mechanical testing of bonded joints was done INSTRON Universal Testing Machine in tension up to fracture. The effect of temperature on both the tensile strength and breaking strain was studied. Micro-hardness test were performed using Vicker's micro-hardness tester to study dependence with concentration of species. The intermetallics formed in the inter-diffusion zone were found to impede in the hardness of bond joints. The result showed an optimum tensile strength of 234 MPa and breaking strain of 4.4% at 775^{o}C. The maximum hardness was found to be 968 HV at the Ti-Cu-Ag interface.

Experiments and Characterization technique involved:

- Tensile testing using an Instron UTM
- Determination of microhardness using Vicker's microhardness tester
- Microstructural analysis using SEM

Vocational Training:

13th June 2011 to 8th July, 2011 — M.N. Dastur & Company (P) Ltd., Kolkata- 700 013.

Iron making, steel making, process metallurgy and rolling mills.

Awards and Honours:

- AIR 12 in GATE 2014 in Metallurgy
- AIR 36 in GATE 2012 in Metallurgy
- Recipient of the GAABESU scholarship for 4 years during B.E.
- Recipient of the Late Kshudiram Hazra Smriti Scholarship of Merit.
- Secured 1st position in the H.S. Examination 2007 in Irhpala K.M. Intuition.
- Secured 1st position in the Madhyamik Examination 2005 in Khasbarh High School and received Scholarship of Merit.

Extra-curricular activities:

- Participated in Open Day'13 organized by IISc with an event, Shape Memory Alloy.
- Represented the Department of Materials Engineering in Inter Department Cricket Tournament, IISc, 2013.
- Presentation: "Development of Lancing Technology in LD Converter", Department of Metallurgy and Materials Engineering, Bengal Engineering and Science University, Shibpur.
- Member of organizing committee of REBECA'12, the Annual Cultural Fest of BESU, 2012.

References:

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