



Tajammul Hussain

(M.S Materials Engg from NTNU, Trondheim, Norway)
(B.Sc Engg Metallurgy & Materials from UET, Lahore , Pakistan)

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EDUCATION	YEAR
Norwegian University of Science & Technology (NTNU), Trondheim, Norway <ul style="list-style-type: none">MS Engg. Metallurgy (Light Metal Production), ECTS / Norwegian Good Grade	2006
University of Engineering & Technology (UET), Lahore, Pakistan <ul style="list-style-type: none">B. Sc (Engg.) with Honors, Metallurgy & Materials Science (4th Year 80% marks)	2000
Federal Board, I.M.C.B Sector F-7/3, Islamabad, Pakistan <ul style="list-style-type: none">HSSC (73% marks)	1994
Federal Board, F.G Boys Higher Sec School G-8/4, Islamabad, Pakistan <ul style="list-style-type: none">SSC (80% marks)	1992

PROFESSIONAL BODY AFFILIATIONS & EXPERIENCE

- Professional Engineer at **Pakistan Engineering Council** (Registered since **August 2001**) *PEC No. Metal / 1489*
- Member Metallurgy at **Pakistan Institute of Engineers** (Registered since October 2003)

Experience

Professional experience at National Scientific & Technical Engineering Organization, Islamabad / Rawalpindi, Pakistan from June 2000 to Present and at Norway, Trondheim, NTNU, as Post Graduate Researcher from Aug 2004 – Jul 2006.

Skills & Research Interests

The broad area of specialties wherein I have worked and acquired skills during professional journeys is listed below:

- Advanced materials and processes
- Metallography, Fractography, NDT (Radiography, UT, CT scan etc.) & compositional analysis
- Material Characterization (SEM, XRD, TGA, FTIR, Chromatography etc. for material evaluation)
- Welding & Joining Processes (TIG, MIG, Laser, EBW, FSW, Brazing, Soldering etc.) for assembly
- Heat Treatment Operations (Annealing, Normalizing, Quenching & Tempering etc. to optimize and manipulate mechanical strength properties)
- Surface Engineering (Surface Treatments such as electroplating, Anodizing, Galvanizing, passivation to improve functional properties)
- Composite materials properties optimization
- Aluminum Production through electrolytic (Hall-Heroult) reduction cell of Alumina study
- Casting, Forging and extrusion Operations
- Reverse Engineering of Materials / alloys using phase diagrams and heterogenous equilibria
- Debonding phenomenon study (Metal to Non-Metal substrates)
- Springs development for engineering applications/devices

I believe in totality of fundamentals, procedures and techniques for the services, development and production of future oriented advanced materials, devices and techniques.

The development and characterization of Smart ceramic / composite (Inert) material "TiB₂" for cathode block to be used in aluminum production electrolysis cell via hot pressing technique was the core topic of post-graduation thesis. I studied the behavior of this material after exposure to molten Aluminum to understand the phenomenon of grain boundary diffusion and degradation of material by grain boundary penetration.

During the MS Program, special emphasis was given to aluminium production activities including principles of electrolytic process, cell operation, cell structural construction, behaviour and reaction mechanism of various raw materials, and limitations and troubleshooting of cell operation.

I practically worked on XRD for compositional analysis; Optical microscopes, SEM integrated with EDS and INCA software for quantitative / qualitative metallographic and point-area map chemical analysis.

While pursuing undergraduate, I came across physical metallurgy, mechanical metallurgy, heat treatment principles and structural metallurgy with plastic deformation theory.

Having a sound background in above mentioned material areas, I have a strong ***foundation and interest*** for the research field related to **Thermo mechanical treatment, Micro structural evaluation – phase property relationship and characterization of Advanced Materials i.e. Hybrid Materials, Composites, super alloys etc. intended for utilization under different environmental conditions**. There is a direct correlation between the processing parameter, microscopic configuration of atoms and molecules and a material's macroscopic, or "visible," properties. Understanding how properties such as structural integrity or ductility are derived from the atomic structure of a substance would enable to manipulate microscopic structures and relevant processing to achieve desired large-scale functional properties.

PROJECTS / REPORTS

BSc (Engg) Project:

Effect Of Repeated Heating and Cooling on the Grain Size of Plain Carbon (1045) Forged Steel

This project covers the following practical and experimental area:

- Hot forging of cast billet to different % reductions.
- Repeated Heat treatment of forged samples (Normalizing).
- Metallographic analysis of forged and normalized samples.
- Grain Size Measurement by ASTM comparison method & Hardness measurement analysis.

MS (Engg) Thesis:

- Investigation & analysis of the behaviour of Titanium Diboride (TiB₂) inert cathode material in molten Aluminium (Material degradation by Grain boundary penetration) for Al production electrolytic cell use.

Mini Projects in master's degree:

- Hot pressed sintering and characterisation of TiB₂ Inert cathode for Aluminium electrolysis cell
- Refractory Materials in Furnaces and Ladles for Production and Refining of Silicon Metal

LECTURES DELIVERED

- Fundamentals of Aluminum Production Process
- Carbon Fiber Composites
- Fractography & Failure Analysis (Failure of connecting rod bolts in a ground-based engine)
- Understanding Diversity, equity & inclusion and Respect of Colleagues Belief

COMPUTER SKILLS

- Basic level of materials Engg. software **Fact Sage and HSC** for solving & interpreting metallic materials phase diagrams (utilized during Master Studies)
- Windows, M.S. Office (Word, Microsoft Excel, PowerPoint)
- Hands on Internet applications and web surfing

SOFT SKILLS

- Problem solving
- Dependable and reliable
- Good Interpersonal and Communication skills
- Good Listening & Language Skills
- Team Player & Adaptability

AWARDS & ACHIEVEMENTS

- Norwegian Government scholarship Award for master's program (Engg.) (Year 2004-2006)
 - Student Award for participation in Technical Conference "NanoSMAT 2005" at Portugal (2005)
 - 2nd & 3rd Position holder consecutively in 1st year and 2nd year of BSc Engg
 - Dramatic & Literary Society Member, U.E.T Lahore (1997)
 - Participation in 4th South Asian Federation (SAF) games, held In Islamabad, Pakistan. (1989)
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PARTICIPATION IN COURSES AND CONFERENCES

- Lecture on Steel Melting & Refining Techniques at Heavy Mechanical Complex, Taxila, Pakistan (August 12, 2015)
- Frctography & Failure Analysis course at Materials Engg Deptt, NUST, Islamabad, Pakistan (June to September 2012)
- International conference on surfaces & nanostructured materials, University Of De Aveiro, Portugal (6-9 Sep 2005)
- 24th International course on process metallurgy of aluminum, NTNU, Trondheim, Norway (May-June 2005)
- Norwegian language course Organized by International Office, NTNU, Norway (2004-2005).
- Short Course on Nano Sized and nanostructured materials: Process technology, characterization, properties and industrial applications, University Of De Aveiro, Portugal (Sep 2005)
- Kaizen management and 5-S Productivity Tools (Short Course in Pakistan NPO- 2003)

PUBLICATIONS

- Effect Of surface Decarburization on the Mechanical Properties of HSLA Steel
(Published in the European Congress on Advanced materials and Processes, Euro mat, P61)
(5-8 September 2005) (Prague, Czech Republic)
- Widdmannstatten structure ferrite in HSLA steel sheets and its Removal
(Published in the European Congress on Advanced materials and Processes, Euro mat, P61)
(5-8 September 2005) (Prague, Czech Republic)
- Effect Of rolling In the Intercritical Region of Dual Phase Steel And Determination Of Aspect Ratio
(Published in the Engineering Horizon, Pakistan)
- Advanced Materials in Biotechnology
(Published in the - International conference on surfaces, coatings, and nanostructure materials, P -38)
University Of De Aveiro, Portugal (6-9 September 2005)

CO-CURRICULAR ACTIVITIES

- Hiking & Trekking
 - Cricket & Cycling
 - Travelling & Tourism
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