Dr. Muhammad Ali Siddiqui

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Professional Experience

2016- Present **Assistant Professor**

- Department of Metallurgical Engineering, NED University of Engineering & Technology, Pakistan

2012– 2016: **Lecturer**

- Department of Metallurgical Engineering, NED University of Engineering & Technology, Pakistan

2012– 2017: **Visiting/part time Faculty Member:**

- Dr. Ishrat-ul-Ebad Khan Institute of Oral Health Sciences, DOW University Health Science, Pakistan
- Department of Materials Engineering, NED University of Engineering & Technology, Pakistan

2009– 2012: **Laboratory Engineer,**

- Department of Materials & Metallurgical Engineering, NED University of Engineering and Technology, Pakistan

2008 –2009: **Production Engineer,**

- H.M Cables, Kottri, Plant, Pakistan

Education

2017-2021:

- Ph.D, **Materials Science and Engineering**, Specialization: Material Processing Engineering, Institute of Metal Research (IMR) Chinese Academy of Sciences (CAS) Shenyang-China, University of Science and Technology of China (USTC-Hefei-China).
- Dissertation: Comprehensive electrochemical studies of Ti-xCu biomedical alloys in a physiological environment

PhD research work focuses on the comprehensive electrochemical studies of Ti-xCu biomedical alloys in a physiological environment. The newly developed Ti-xCu possesses excellent antibacterial properties due to releases copper ions and kills bacteria. However, the Cu ion release is directly related to the stability of surface oxide (passive film) formed on the Ti-Cu alloy substrate. The early reported work on the electrochemical study only highlights the preliminary studies on the Cu-ions removal without addressing the passive film characteristics and also not attended to how Cu ions are migrated from the alloy substrate to the oxide layer and into the bio-solution. Furthermore, it is known that the biological fluid not only contains inorganic ions but also holds various organic protein molecules, and no study has been reported to evaluate

the adsorption behavior of protein on the Ti-xCu alloy. Therefore, he comprehensively worked on these current issues and incorporated various electrochemical and surface analysis techniques with the aid of Quantitative analysis of depth profiles. The data were analysed within the framework of the Point defect Model (PDM). It is believed that this systematic research will develop a better understanding of the alloy corrosion mechanism and is expected to be beneficial in the development of these novels, bio-metallic materials as implant products in clinic applications. The research area has the following five objectives, and has successfully met these objectives and has good publication in SCI journal.

1. Study the mechanism of Cu-ions removal in phosphate-buffered saline (PBS) solution.
2. Investigate the effect of Cu content on the passive film properties within the framework of the Point Defect Model (PDM-II).
3. To suggest the PDM scheme for the Ti-Cu alloy.
4. Study of the adsorption behavior of the serum protein on the Ti-3Cu alloys.
5. Effect of serum protein addition on the antibacterial and electrochemical properties of Ti-3Cu alloy.

2009-2011:

- M.E, **Material Engineering,** NED University of Engineering and Technology, Pakistan
- Dissertation: *"Effect of Calcination and Sintering Temperatures on BaTiO3 Piezoelectric Ceramic Material Synthesized by Solid-State Reaction"*

2004-2007:

- B.E, **Metallurgy and Materials Engineering**, Mehran University of Engineering and Technology, Pakistan
- *Thesis: "Hardenability and Microstructural Study of AISI 1045 and DIN 20MnCr5 Steels",*

Publications

1. **Muhammad Ali Siddiqui**, Ihsan Ullah, Sharafadeen Kunle Kolawole, Cong Peng, Jiewen Wang, Ling Ren*, Ke Yang and Digby D. Macdonald**, Study the existing form of copper (p-type oxide/segregation) and its release mechanism from the passive film of Ti-7Cu alloy, *Corrosion Science Volume 190, September 2021, 109693* https://doi.org/10.1016/j.corsci.2021.109693 IF = 7.205

2. **Muhammad Ali Siddiqui**, Ling Ren*, Digby D. Macdonald**, and Ke Yang, Effect of Cu on the passivity of Ti-*x*Cu (*x = 0, 3 and 5 wt %)* alloy in phosphate-buffered saline solution within the framework of PDM-II, *Electrochimica Acta, Volume 386, 1 August 2021, 138466* https://doi.org/10.1016/j.electacta.2021.138466 IF = 6.901

3. **Muhammad Ali Siddiqui,** Ihsan Ullah, Hui Liu, Shuyuan Zhang, Ling Ren*, Ke Yang Preliminary study of adsorption behavior of bovine serum albumin (BSA) protein and its effect on antibacterial and corrosion property of Ti-3Cu alloy, Journal of Materials Science & Technology 80 (2021) 117–127 https://doi.org/10.1016/j.jmst.2020.11.046 IF = 8.067

4. Ihsan Ullah, **Muhammad Ali Siddiqui**, Hui Liu, Sharafadeen Kunle Kolawole, Ji Zhang, Shuyuan Zhang, Ling Ren,* and Ke Yang,Mechanical, Biological, and Antibacterial Characteristics of Plasma-Sprayed (Sr, Zn) Substituted Hydroxyapatite Coating, ACS Biomaterial Science & Engineering 2020 https://dx.doi.org/10.1021/acsbiomaterials.9b01396 IF = 4.51

5. Ihsan Ullah, **Muhammad Ali Siddiqui**, Sharafadeen Kunle Kolawole, Hui Liu, Ji Zhang, Ling Ren,∗, Ke Yang Synthesis, characterization and in vitro evaluation of zinc and strontium binary doped

hydroxyapatite for biomedical application, Ceramic International Volume 46, Issue 10, Part A, July 2020, Pages 14448-14459 https://doi.org/10.1016/j.ceramint.2020.02.242IF = 3.83

6. A. Ibrahim, M. Ali, **Muhammad Ali Siddiqui**, M. Shakeel, S. Jameel, S. Hayat, M. J. Afzal, A. S. Sheikh, M. A. Imam, Microstructural features and corrosion behavior of $Al_{0.5}FeCrNiTi_{0.25-x}Si_x$ high-entropy alloys, Physics of Metal and Metallography (accepted). IF = 1.064

7. Sharafadeen Kunle Kolawole, Wang Hai, Shuyuan Zhang, Ziqing Sun, **Muhammad Ali Siddiqui**, Ihsan Ullah, Wei Song, Frank Witte, Ke Yang,∗Preliminary study of microstructure, mechanical properties and corrosion resistance of antibacterial Ti-15Zr-xCu alloy for dental application Journal of Materials Science & Technology 50 (2020) 31–43 https://doi.org/10.1016/j.jmst.2020.03.0033 IF = 8.067

8. Imran Abbas, Yanxiang Wang, Hassan Elahi*, **Muhammad Ali Siddiqui**, Mudaser Ullah and Faisal Qayyum Effect of $MoSi_2$-Si_3N_4/SiC Multi-Layer Coating on the Oxidation Resistance of Carbon/Carbon Composites above 1770 K MDPI Journal of Composites Science J. Compos. Sci. 2020, 4(3), 86; https://doi.org/10.3390/jcs4030086(ISSN 2504-477X; CODEN: JCSOGF) Open Access Journal

9. Junxiu Chen, Xiangying Zhu, Iniobong P. Etim, **Muhammad Ali Siddiqui**& Xuping Su Comparative study of the effects of MAO coating and Ca-P coating on the biodegradation and biocompatibility of Mg69Zn27Ca4 metal glass, Materials Technology Advanced Performance Materials (2020) https://doi.org/10.1080/10667857.2020.1814061IF = 1.73

10. Sharafadeen Kunle Kolawole, Ling Ren*, **Muhammad Ali Siddiqui**, Ihsan Ullah, Hai Wang, Shuyuan Zhang, Ji Zhang, Ke Yang, Effects of different aging conditions on improvements of microstructure, mechanical properties, corrosion resistance and bactericidal ability of Ti-15Zr-xCu alloys for biomedical applications, Acta Metallurgica Sinica (English Letters) https://doi.org/10.1007/s40195-021-01248-8

11. Shahid Hussain Abro, **Muhammad Ali Siddiqui**, Alidad Chandio, Humair Ahmed Siddiqui, Impact of Nano-sized Aluminum Nitride Second phase Particles on Gamma and Alpha Phase Transformation in Less Carbon added Manganese Steel, *Pak. J. Engg. Appl. Sci. Vol. 27 July 2020 (p. 85–92)*

12. Ali Dad Chandio, Muhammad Basit Ansari, Shahid Hussain, **Muhammad Ali Siddiqui**, Silicon Carbide Effect as Reinforcement on Aluminium Metal Matrix Composite, J.Chem.Soc.Pak., Vol. 41, No. 04, 2019 (HEC X-Category)

13. Shahid Hussain Abro, Alidad chandio, **Muhammad Ali Siddiqui**,and Iftikhar A. Channa, Aluminum and Aluminum Nitrides Effect on NucleationSites in Micro-alloyed steel *Proceedings of the Pakistan Academy of Sciences: A. Physical and Computational Sciences* 56 (3): 1-10 (2019) Copyright © Pakistan Academy of Sciences ISSN: 2518-4245 (print), 2518-4253 (online)

14. Iftikhar Ahmed Channa, Aqeel Ahmed Shah, Shahid Hussain Abro, **Muhammad Ali Siddiqui,** M.Mujahid, Ali Dad Chandio, Effect of Tempering Temperature on the properties of Martensitic Stainless Steel AISI-420, IBA Sukkur University, Vol. 2, No.1 January-June-2019

15. **Muhammad Ali Siddiqui**, Fayaz Hussain, M Sohail Hanif, Ahmad Azmin Mohamad, Muhammad Tufail, Effect of Calcination and Sintering Temperatures on Physical Properties of Barium Titanate Ceramic, *Int. J. Electroactive Mater.* 6 (2018) 42-47

16. Shahid Hussain Abro1, Abdulaal Zuhayr Khazaal, **Muhammad Ali Siddiqui**, Effect of Initial Grain Size and Microstructure on Tensile Strength of Low Carbon- Manganese Steel, *J. Appl. Emerg. Sci., 2018, 8(2)*

Achievements, Distinction and Awards:

1. Awarded fully funded IMR Scholarship also a CSC scholarship for PhD studies, but enjoyed the CSC scholarship with the research aid.
1. Published PhD work in good impact factor journals/Q1 journals.
2. Nominated for **Foreign-** *Equipment* **-Trainings** held in Singapore, South Korea and China.
3. Nominated for **Student Exchange Program** between Pakistan and Bangladesh: *Bangladesh Universities study Tour.*
4. Nominated for workshop course on **"Management and Leadership Development"** arranged by "National Institute of Labour Administration Training (NILAT), Government of Sindh, Pakistan.
5. Nominated for "**Internal QMS Auditor Course"** arranged by Lloyd's, LRQA.
6. Nominated for **"Quality Management, Control and Assurance"** arranged by Higher Education Commission-Pakistan (an indigenous on campus training).
7. Member or Convener of different technical evaluation committees of Tenders of Laboratory Equipment since department inauguration, 2010.
8. Secured **1st Position** or highest CGPA in Batch in Master of Engineering.
9. Secured **4th Position** in Bachelor of Engineering.

Trainings (Obtained and Delivered)

i. Foreign Technical Training

1. ***China:*** Low and Ambient Temperature Impact Tester 150J and 300J with cryogenic attachment (PIT-G pendulum Testing Machine), arranged by WANCE China 2016.
2. ***South Korea:*** Computerized Universal Testing Machine (DTU-900HCB), Salt Spray Tester (DTC-104A) and Charpy Impact Tester arranged by Daekyung Tech & Testers. December 2014.
3. ***Singapore:*** Metallurgical Microscope Image Analysis System" and Software "3D analysis DOCU arranged by Olympus, 2010.

ii. Indigenous Training Obtained from Local Suppliers

1. Vacuum Tube Furnace, 2016
2. CNC Router, UK, 2015
3. Dynamic Fatigue Testing Machine, shore western USA. 2014
4. Investment Casting Setup, China, 2013
5. Atmospheric controlled Sintering chamber Furnaces, Turkey. 2013
6. PANalytical, on XRD Software, X'Pert HighScore Plus. 2011
7. Metallographic Lab Equipment, Turkey. 2010

Administrative Responsibilities/Duties

i. Member of Different Committees / Tender Committee Member.

- Member of Pakistan Engineering Council (PEC).
- Member of Institute of Corrosion, UK.
- Member of Board of Studies, BOS –Department Level.
- Member of Duty Society, NED University of Engineering and Technology
- Member or Convener of different technical evaluation committee of the Laboratory Equipment Tenders.

ii. ISO 9000-Area Coordinator/PEC Coordinator (till 2016)

- Manage and monitoring all the academic activities.
- Planning and perform the audits as per schedule of NED UET QSP.

iii. Laboratory In-charge

- Heat Treatment and Sintering Furnace Laboratory, 2013-2017
- Foundry Laboratory: Sand Testing and Investment casting laboratory, 2013-2017
- Inspection and Testing of Materials Laboratory, Since Jan 2015 to 2017 and 2021 to till
- Mechanical Working Laboratory, 2016-2017

iv. Procurement and Installation of Laboratory Equipment's

- Tendering, Procurement and installation of equipment procured by Metallurgical Engineering Department, since 2010 to date
- Actively engaged for Commissioning and Installation of the following Equipment's/Machines.

1. Metallography Sample Preparation Equipment's, it includes Abrasive cut-off Machine, Mounting Machine, Automatic Grinding/Polishing Machine. (2010 and 2012)
2. Metallurgical Microscope and Stereo Microscope, (2010-11)
3. XRD and its Software X-pert high score Plus (2011) **(Materials Engineering Department)**
4. Heat Treatment and Sintering Furnaces, (2013)
5. Investment Casting Setup. Includes. Vulcanizer, Wax Injector, Vacuum Mixer, Drying oven, Air melting system, and Induction melting system.(2013)
6. Humidity Chamber (2013)
7. Fatigue Testing Machine. (2014)
8. Universal Testing Machine. (2014)
9. Salt Spray Chamber (2014)
10. CNC Router (2015)
11. Impact Testing Machine (2016)
12. vacuum Tube Furnace (2016)

v. Others

- Departmental Representative for "Metallurgical Commercial Wing". 2013-2016

Industrial Training (Certificate Courses)

1. ***Pakistan:*** Pak Swiss PSTC PCSIR on Dies and Mold Technology, 2009
2. ***Pakistan:*** Bolan Casting limited, Internship, 2007
3. ***Pakistan:*** Peoples Steel Mills Limited, Internship, 2006
4. ***Pakistan:*** Internal QMS Auditor Training Course (Based on ISO 9001:2008), on 28th -29th November 2014 From Lloyd's Register LRQA clubbed with HEC Indigenous on Campus Training on Quality Assurance, NED UET, 28th Nov to 10th December, 2014.
5. ***Pakistan:*** Technical Writing with Latex, 25th to 30th August, 2014
6. ***Pakistan:*** Management and Leadership Development, 21st to 23rd September, 2016

Webinar/Conference/Seminar Attained

1. Safety in chemical Industries, University of Karachi
2. Advance Structural Materials organized by NED Materials Society in collaboration with AQUAFIN Pakistan (Pvt) Ltd.
3. International Conference on Energy and Sustainability arranged by Mechanical Engineering Department, NED UET, Pakistan, and April 2013, 2014, and 2015.
4. 1st International Conference on Advanced Materials and Process Engineering-jointly organized by Department of Chemical and Polymer and Petrochemical Engineering NED

University of Engineering, 2015

5. 2019 International Symposium of Biotechnology on Biomaterials, Stem cells and Tissue engineering at Institute of Metal Research, Chinese Academy of Science- Shenyang- China.