CURRICULUM VITAE

ALIREZA KARIMI

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EDUCATION

2017 - 2020

M.Sc. in Materials Engineering — *TEHRAN, IRAN*

Iran University of Science and Technology (IUST)

- ***Thesis:*** *Design and implement a novel sustainable combustion welding process for* ***dissimilar joining*** *of metal-ceramic couples using* ***NiTi*** *interlayers*
- ***CGPA:*** *15.16/20 (Iranian Scale)*
- ***Supervisors:*** *Prof. Mandana Adeli and Prof. Mansour Soltanieh*

2013 - 2017

B.Sc. in Metallurgy and Materials Engineering — *ISFAHAN, IRAN*

Golpayegan College, Isfahan University of Technology (IUT)

- ***Thesis:*** *Production and characterization of corrosion-resistant amorphous Fe-Ni-Cr coatings*
- ***CGPA:*** *15.17/20, last two years 17.17/20 (Iranian Scale)*
- ***Supervisor:*** *Prof. Seyed Mahdi Rafiaei*

RESEARCH INTERESTS

- Advanced Materials (High Strength Lightweight Alloys, Metal Matrix Composites (MMCs)) Synthesis, Welding, and Characterization.
- Machine learning, Predictive Modeling, Neural Networks, FEM simulation, FEM for Manufacturing Processes

RESEARCH EXPERIENCES

Machine Learning Assisted Investigating the effect of Mechanical Activation Duration (MAD) on microstructure and corrosion behavior of TiAl intermetallic compounds

2021 - present

School of Materials and Metallurgy Engineering, IUST

- **Fabricated TiAl** Intermetallic compounds with various MADs using the SHS process.
- **Investigated** the effect of MAD on corrosion behavior **(EIS[1])** and microstructure **(SEM)** of TiAl samples
- **Employed** a **constructed ANN architecture** for investigating the effect of MAD on the corrosion behavior of synthesized TiAl intermetallic.

Study on the wear behavior of NiAl-TiC-TiB_2 composite produced by the combustion synthesis process

2020 - present

School of Materials and Metallurgy Engineering, IUST

- **Fabricated NiAl / TiC-TiB_2 composites** using a combustion synthesis process
- **Enhanced** composite hardness profile due to **even distribution** of TiC-TiB_2 phases
- **Demonstrated** superior wear resistance in composites with higher TiC-TiB_2 using **Sliding wear** tests
- **Trained** an **ANN** model to **predict** the properties of composite with various TiC-TiB_2 content.

Design and implement a novel and sustainable combustion joining process using combustion synthesis reactions in Ni-Ti powder mixtures

[1] Electrochemical Impedance Spectroscopy

2018 - 2020 | *School of Materials and Metallurgy Engineering, IUST*

- **Fabricated** VCN-150 steel joints and then WC-Co/VCN-150 dissimilar joints via combustion synthesis within **Ni-Ti** compound (**Self-heating process**)
- **Designed** and **fabricated** a novel **set-up** for exerting an **axial force** on the welding components in the **Argon** atmosphere and **decreasing** the interlayer porosity
- **Performed** microstructural and mechanical characterization of joints (**SEM**, **XRD**, **Shear strength**)

Effect of space holder materials on the porosity of synthesized NiTi Foams

2018-2019 | *School of Materials and Metallurgy Engineering, IUST*

- **Evaluation** of the effect of **space holder** material on the **distribution** and **size** of the porosities
- **Performed** microstructural characterization **(SEM)** and Phase analysis via **XRD techniques**

Fabrication of amorphous Fe-Ni-Cr coatings by electric deposition process

2015 - 2017 | *Department of Materials Engineering, IUT*

- **Investigated** the impact of **current density** on the **thickness** and **structure** (amorphous/crystalline) of coatings

PUBLICATION

- F. Soleimani, M. Adeli, M. Soltanieh, H. Saghafian, A. Karimi, **Fabrication and wear behavior of TiC/TiB_2-reinforced NiAl intermetallic matrix composites**, Wear, (Under Review)
- A. Karimi, M. Adeli, M. Soltanieh, **Dissimilar joining of cemented carbide to low-carbon steel via combustion welding: Effect of process parameters on the interfacial microstructure and joint strength**, Journal of Manufacturing Process, Vol. 77, Pages 551-560, https://doi.org/10.1016/j.jmapro.2022.03.043
- A. Karimi, M. Adeli, M. Soltanieh, **The application of combustion synthesis reactions in Ni-Ti system in the joining of steel to tungsten carbide**, Journal of New Materials, Vol. 11, pages 103-114, 20.1001.1.22285946.1399.11.41.8.2
- A. Karimi, M. Adeli, M. Soltanieh, **Investigating the possibility of establishing steel-steel joints using combustion synthesis reactions**, 8th International Conference and Exhibition on Materials Engineering and Metallurgy Oct. 2019, https://civilica.com/doc/963690/

HONORS AND AWARDS

Patent (In process): Intelligent atmosphere supply system for sinter furnaces.

- **Facilitated** the atmosphere-controlling process of box furnaces (design and implementation)

Awarded governmental full scholarship (Tuition Waiver) and governmental fund (Research Grant)

- Issued by Ministry of Science, Research and Technology due to national entrance exam for two years of M.Sc. (2017-IUST) and four years of B.Sc. (2013-IUT)

TEACHING EXPERIENCES

Graduate Teaching Assistant (Metallurgical Processes Laboratory)

2018 (Aug - Dec) | • School of Materials and Metallurgy Engineering (IUST), Prof. M. Adeli (*adelim@iust.ac.ir*)

Tutor (English - Math)

Feb2022-present | • High-school students

WORK EXPERIENCES

CURRICULUM VITAE

Metallurgical Laboratory Manager

Sep2021-present | *SEPAHAN FOOLAD ATASHGAH (STEEL CASTING)*

- **Teamwork leadership** in the **research and technological** development group (14 people).
- **Achieved** ISO/IEC **17025** Certification.
- **Performed scientific workshops** for teaching laboratory members **(SEM, TEM, ICP)**
- **Supervision** of equipment **calibration (OES, XRF)**

Research Assistant (part-time from Sep 2021)

Sep2018-present | *IRAN UNIVERSITY OF SCIENCE AND TECHNOLOGY*

- **Contribution** to **data analysis** and interpretation as a **diligent** research assistant.
- Assisting in **literature reviews**, experiment **design**, and research documentation.
- **Detail-oriented** and **proactive**, I thrive in a **collaborative** research environment.

Metallurgical Laboratory Specialist

2021 (Feb-Sep) | *HAMIRAN STEEL (REFERENCE LABORATORY)*

- **Acquired Hands-on experience** with microstructural (**SEM, OM**), mechanical (**tensile, micro-hardness**), **Optical Emission Spectroscopy**, and NDT characterization techniques.
- Customer **Scientific consultation**.

Patent Engineer

2020 (Jan-Oct) | *IDI COMPANY*

- **Drafting** and **filing** patent applications, **conducting research** to ensure the inventions are unique, and navigating legal and technical aspects to **protect intellectual property**.

Engineering Internship

2016 (Apr-Sep) | *ESFAHAN STEEL COMPANY*

- **Performed standardized mechanical and microstructural QA tests** (ASTM, ISO, DIN)

LANGUAGE SKILLS

Persian: *Native Language*

English: *Fluent,* ***TOEFL (iBT):*** *On December 2023*

PERSONAL SKILLS

Technical Skills	• *Materials characterization techniques (**TEM, SEM, OM, RAMAN), XRD, EDS, OES, ICP, XRF, EIS** (corrosion), **SLIDING WEAR TEST**, **NDT** (UT, PT, MT), and **MECHANICAL** testing equipment.*
Communication skills	• *Gained through my experience as a materials selection **consulting specialist**, teaching experience as a **tutor** and graduate **teacher assistant**, and **management** experience in a laboratory.*
Managerial skills	• ***Head** of metallurgical laboratory (currently responsible for a team of **14 people**)*
Computer skills	• ***ANSYS**, HighScore (plus), SOLIDWORKS, Origin, Minitab, ZsimpWin, EC-Lab, Microsoft Office, **Python** programming language*
Certificates	• ***TEM** (EPFL), **Python** (University of Michigan), **Data Science** (IBM, Georgia Tech), **Conference Presentation** (Int. Imat Conference)*

REFERENCES

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