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

RESEARCH EXPERIENCES

Investigating the effect of Mechanical Activation Duration (MAD) on microstructure and corrosion behaviour of synthesized TiAl

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** Artificial Neural Network (**ANN**) models for investigating **corrosion** behaviour and **microstructure** of TiAl intermetallic in various MADs.

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.

[1] Electrochemical Impedance Spectroscopy

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

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*

- **Conducted** thorough analysis to assess the impact of **space holder** material on porosity **distribution** and **size**.
- **Executed** microstructural characterization using **SEM** and **conducted** phase analysis through **XRD** techniques

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

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

- **Investigated** current density's impact on coating **thickness** and **structure** (amorphous/crystalline)

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, DOI: 10.2139/ssrn.4676363
- 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

Metallurgical Laboratory Manager

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

- **Led** a team of **14 professionals** in research and technological development**.**
- **Achieved ISO/IEC 17025** Certification.
- **Performed** scientific **workshops** for laboratory members. (**Steel Design**, **OES**, **Metallography**)
- **Collaborate** with external partners (academia, lab equipment providers, and material suppliers).
- **Supervised** laboratory equipment **calibration**.

Research Assistant (part-time from Sep 2021)

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

- **Played** a key role in data analysis and **interpretation** as a dedicated research assistant.
- **Assisted** in literature reviews, experiment design, and comprehensive research documentation.
- **Thrived** in a collaborative research environment, showcasing a **detail-oriented** and **proactive** approach.

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 (OES), Box** and **Inductive Furnaces,** and **NDT** characterization techniques.
- **Provided** scientific **consultation** to customers

Patent Engineer

2020 (Jan-Oct) | *IDI COMPANY*

- **Drafted** and **submitted** patent applications**, conducting thorough research** to verify the uniqueness of inventions.

Engineering Internship

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

- **Conducted** standardized mechanical and microstructural quality assurance tests in accordance with **ASTM, ISO, and DIN** standards.
- **Acquired** hands-on experience with **OES** and Continuous Casting Machines (**CCM**).

LANGUAGE SKILLS

Persian: *Native Language*

English: *Fluent,* ***TOEFL (iBT):*** *On February 2024*

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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