CURRICULUM VITAE

ALIREZA KARIMI

Research Assistant – Laboratory Head

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EDUCATION

2017 - 2020 — **M.Sc. in Materials Engineering** — *TEHRAN, IRAN*

Iran University of Science and Technology (IUST)

- ***Thesis:*** *Investigating the parameters affecting the* ***joining*** *of tungsten carbide to low-alloy steel using* ***sustainable combustion synthesis reactions*** *of Nickel Titanium (****NiTi****) as an interlayer.*
- ***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 amorphous Fe-Ni-Cr coatings*
- ***CGPA:*** *15.17/20,* ***last two years*** *= 17.17/20*
- ***Supervisor:*** *Prof. Seyed Mahdi Rafiaei*

RESEARCH EXPERIENCES

Study on 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 alloys with various MADs using Self Propagating High-temperature Synthesis (**SHS**).
- **Investigated** the effect of MAD on corrosion behaviour (**EIS**) and microstructure (**SEM**) of TiAl.
- **Achieved** a novel α2/γ lamellar microstructure to enhance toughness in TiAl alloys.
- **Utilized** Artificial Neural Networks **(ANN)** Machine Learning (**ML**) models to study **corrosion** behavior and **microstructure** in TiAl with different MADs**.**

Machine Learning Assisted Investigation of Wear Behavior in NiAl-TiC-TiB2 Composites Synthesized via Eco-Friendly Combustion Synthesis: Experimental Analysis and Predictive Modeling

2020 - present — *School of Materials and Metallurgy Engineering, IUST*

- **Fabricated NiAl / TiC-TiB_2 composites** using a combustion synthesis process.
- **Achieved** superior wear resistance in composites with higher TiC-TiB_2 using **Sliding wear** test.
- **Trained** an **ANN** Machine learning model to **predict** the **wear** properties of composite.

Sustainable Combustion Joining of Tungsten Carbide to Low-Alloy Steel Using NiTi Interlayers: Fabrication, Microstructure, and Mechanical Characterization

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

- **Designed** and **fabricated** a **novel** set-up for **Creating** WC-Co / VCN-150 dissimilar joints via **combustion synthesis** within **Ni-Ti** compound.
- **Achieved** higher joint strength by reducing interlayer **porosity** and optimizing Ni+Ti **particle size**.
- **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** current density's impact on coating **thickness** and **structure** (amorphous/crystalline)

PUBLICATIONS

- A. Karimi, M. Adeli, M. Kobashi, **Investigating the effect of Mechanical Activation Duration (MAD) on microstructure and corrosion behavior of TiAl intermetallic compounds**, Advanced Powder Technology 35 (2024), https://doi.org/10.1016/j.apt.2024.104690.
- F. Soleimani, M. Adeli, M. Soltanieh, H. Saghafian, A. Karimi, **Fabrication and wear behavior of TiC/TiB_2-reinforced NiAl intermetallic matrix composites**, Journal of Materials Research and Technology 30 (2024) 5770-5784, https://doi.org/10.1016/j.jmrt.2024.05.025
- 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 77 (2022) 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 11 (2021) 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 (2019), https://civilica.com/doc/963690/

HONORS AND AWARDS

Patent (In process): Intelligent atmosphere (H_2, Ar) supply system for sinter furnaces.

- **Designed** and **implemented** atmosphere control for box furnaces.
- **Created** a **Python-based** Arduino system for intelligent **hydrogen** flow monitoring to ensure safety.

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)

SKILLS / CERTIFICATES

Technical Skills	• *Materials characterization techniques (**TEM, SEM, OM, RAMAN**), **XRD, EDS, OES, ICP, XRF, EIS** (corrosion), **SLIDING WEAR** TEST, **NDT**, and **MECHANICAL** testing equipment.*
Computer skills	• ***Python** (TensorFlow, scikit-learn, PyTorch), **Predictive** Modeling, **Neural Networks, ANSYS**, **Numerical Simulation** (Finite Element Method), Tecplot, SOLIDWORKS, Fracture Mechanics Modeling, HighScore (XRD), Origin, Minitab, ZsimpWin, EC-Lab*
Managerial skills	• ***Head** of metallurgical laboratory (currently responsible for a team of **7 people**)*
Interpersonal skills	• ***Gained** through roles in materials selection **consulting**, **tutoring**, graduate **teaching** assistance, and laboratory **management***
Certificates	• ***Python** (University of Michigan), **Materials Data Science** (Georgia Tech), **TEM** (EPFL), **Data Science** (IBM), **Conference Presentation** (Int. Imat Conference)*
Language	• *Persian (native), English, German*

WORK EXPERIENCES

Metallurgical Laboratory Manager

CURRICULUM VITAE

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

- **Led** a team of **7 professionals** (lab technicians, quality control analysts, and research assistants)
- **Achieved ISO/IEC 17025** Certification.
- **Collaborate** with external partners (academia, lab equipment providers, and material suppliers).

Research Assistant (part-time from Sep 2021)

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

- **Played** a Key role in data analysis (**FEM, Machine Learning**) and interpretation, plus assisting with literature reviews, experiment design, and research documentation.

Metallurgical Laboratory Specialist

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

- **Gained** hands-on experience with **SEM, OM, mechanical testing,** Optical Emission Spectroscopy **(OES), furnaces, metallography** while providing **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** mechanical and microstructural tests with experience in **OES** and **continuous casting**

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

REFERENCES

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