Position Offered: PREDOCTORAL RESEARCHER

Project: *Artificial Intelligence to reduce CO2 process emissions of the metal production industry (AIdeal)*

Technological and scientific fields: Green algorithms; Climate change

Location: Madrid, Centro Nacional de Investigaciones Metalúrgicas (CENIM), https://www.cenim.csic.es/

Research Group/PI: MATERALIA, CAROLA ALONSO DE CELADA CASERO, https://www.cenim.csic.es/materalia/

PROJECT SUMMARY

It is estimated that the application of Artificial Intelligence (AI) in conventional processes of heavy industry could reduce fuel combustion emissions by 20%. Additionally, AI also enables the design of new sustainable processes that surpass existing ones in quality. Copper producers are committed to adapting conventional anode furnaces to use hydrogen to ensure their competitiveness and sustainability in the future. How will hydrogen affect the process and quality of copper? To answer these questions, this project will apply AI to optimize the conventional thermal refining process of copper and study the physicochemical effects of replacing natural gas with hydrogen. This knowledge will help adapt existing technology to the use of hydrogen, reducing climate impact and increasing the competitiveness of the metallurgical industry.

PROFESSIONAL PROFILE

Minimum requirements:

BSc. in Physics, Mathematics, Chemistry, Materials Engineering, or Industrial Engineering.
MSc. in Physics, Chemistry, Materials, Mathematics or in Computing.
High level of English.
Knowledge in thermochemical calculations, calculation techniques or computing, and programming languages: Python is essential.

Merits to be considered:

Knowledge of machine learning libraries, experience with techniques for chemical and structural characterization of metallic materials, basics of metallurgical process engineering, oral communication skills and scientific writing.

WHAT IS OFFERED

The project and the research group will provide professional and personal development in the use of Artificial Intelligence and Machine Learning techniques applied to solving the physicochemical problems posed by the replacement of fossil fuels with hydrogen in the metallurgical industry, a key sector for the energy and digital transition. The project will offer the predoctoral researcher access to cutting-edge laboratory equipment, close collaboration with the metallurgical industry (Atlantic Copper), and the appropriate scientific and working environment to ensure the successful development of a doctoral thesis. Competencies will be developed throughout the project, which will include significant training activities, both technical and in research career development, including stays at international research centers. The training plan will correspond to 240 ECTS.

Contract conditions:

Predoctoral Researcher contract of 4 years' duration. Gross annual salary of 23,871.33 €.

Start of contract: before 31 December 2024

PRINCIPAL INVESTIGATOR CONTACT

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