

Partner offer

Date (01-12-2021)

(*) – Mandatory

- (*) Relevant topic(s) in work programme (code & name of the topic(s) line(s))

HORIZON-CL4-2022-RESILIENCE-01-19: Advanced materials modelling and characterisation (RIA)

- Quick description of the project concept

As a partner, CTIF can contribute to the development of new methods for the multi-scale design and characterisation of metallic materials, complemented and validated by simulation or artificial intelligence/machine learning tools accompanying transition to a low-carbon economy. CTIF can collect the needs of the metalworking industry in terms of open repository, identify new clean and low carbon applications and provide the link with standardization bodies.

- (*) Description of the expertise /proposed (up to 1000 characters)

CTIF has metallic high-level expertise including:

- **Alloy design** based on 3 key skills: a team of materials and process experts, experimental means (foundry R&D platform with melting capacities ranging from 1 to 250 kg with high value-added alloying element (Co, Ni, Cr, Ag...) and analysis laboratory) digital tools and material databases;
- **R&D work on microstructure simulation** of steels and aluminium based on commercial code (CAFÉ module) and by recalibrating calculation data with experimental data on test specimens;
- **Development of α -screen** (2021): in-house genetic algorithm (python libraries) than allow to select (via Thermo-Calc and inner data bases) best alloys (characteristics, price, ability to be shape) for a given end-user needs). Use of multi-objectives algorithms (NSGA-III, SPEA-II) for better compromise;
- **Animation of materials standardization committees** with French manufacturers and foundrymen;
- **Development of new alloys:** intermetallics/FeNiHigh Entropy Alloy and Complex Concentrated Alloy for specific markets/ energy, spatial;
- **Recycling of metallic** materials in CTIF's foundry platform or on industrial means to optimize LCA of products.

- (*) Keywords describing the expertise /proposed (up to 10 words)

alloy design, new metallurgies, simulation/multi-scale optimisation, numerical approaches, product/process prediction, metallic recycling, testing and characterisation platforms, interface with end-user needs, algorithms, standardization European member

Organisation information

(*) Organisation and country: CTIF Technical Centre for Foundry Industries - France

(*) Type of organisation:

Enterprise SME Academic Research institute Public Body Other: Association

Former participation in FP European projects?

Yes

Web address: <https://www.ctif.com>

Description of the organisation: Founded in 1946, CTIF is a French Industrial Technical Centre specializing in metallurgy and metal processing. Its historical profession is the foundry. For many years, CTIF has extended its scope of collective action to other businesses such as metal refining, alloy production, additive manufacturing or metal recycling. CTIF has also developed skills in forging, stamping and metal tools. In summary, CTIF is involved in the entire metal cycle after the extraction and reduction phases of the ore. At the very heart of the metal materials transformation sector, CTIF and its some 100 employees aim to unite the actors of the foundry and metallurgy

sector (transformers, users, scientific and technical partners, designers) through industrial R&D and innovation activities and to develop in the fields of design and metallurgy, consulting and innovation, laboratory analyses and training. CTIF's roadmap and R&D programme are based on 3 priority areas: alloy design and new metallurgies, simulation/multi-scale optimisation and recycling/upgrading and environmental and energy transition. CTIF's skills include knowledge and expertise in liquid and solid metallurgy, meta-materials, hot forming processes, numerical simulation tools (thermochemistry, "alloy design", process simulation, functional product calculation, material behaviour prediction, etc.), and standards, means and methods for characterizing metallic products and materials. CTIF is a member of the French Carnot Institute for Energy and Environment in Lorraine (ICÉEL), which has been accredited since 2007 by the French Ministry of Higher Education and Research in recognition of its effective research collaborations with socio-economic partners.

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