

Design and performance of corrosion resistant high entropy alloys and multi-principal element alloys

High-Entropy Alloys (HEAs) and Multi-Principal Elements Alloys (MPEAs) constitute a substantial breakthrough in alloy design. Unlike traditional methods that concentrate on the edges of a multicomponent phase diagram, these alloys focus on its central region. This innovative metallurgical strategy has unlocked a wide new field of research. Since the manufacturing of the first HEA (CoCrFeMnNi) in 2004, the growing interest in these next-generation alloys has led to remarkable enhancements in their mechanical properties across a wide temperature range. Consequently, these alloys have gained significant attention for their potential applications in diverse industrial sectors such as transport, energy, and biomedical fields.

The enhancement of computational approaches these last years ensures quality predictions on both the composition and structure of these alloys. This progress allows us to advance towards the design and optimization of these alloys, ultimately achieving the desired properties.

The workshop will focus on recent advancements in the design and corrosion resistance of HEAs/MPEAs. Special emphasis will be placed on understanding the effects of composition, structure, and environmental factors on their corrosion resistance.

The topics covered by this workshop are:

- computational approaches (DFT, CALPHAD, Machine learning) for the manufacturing of HEAs/MPEAs
- Characterization of HEAs/MPEAs and correlation with their reactivity
- Corrosion resistance: main factors, present state and future opportunities