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# Oxidation Behavior of High-Entropy Alloys as Metallic Supports for MS-SOFCs

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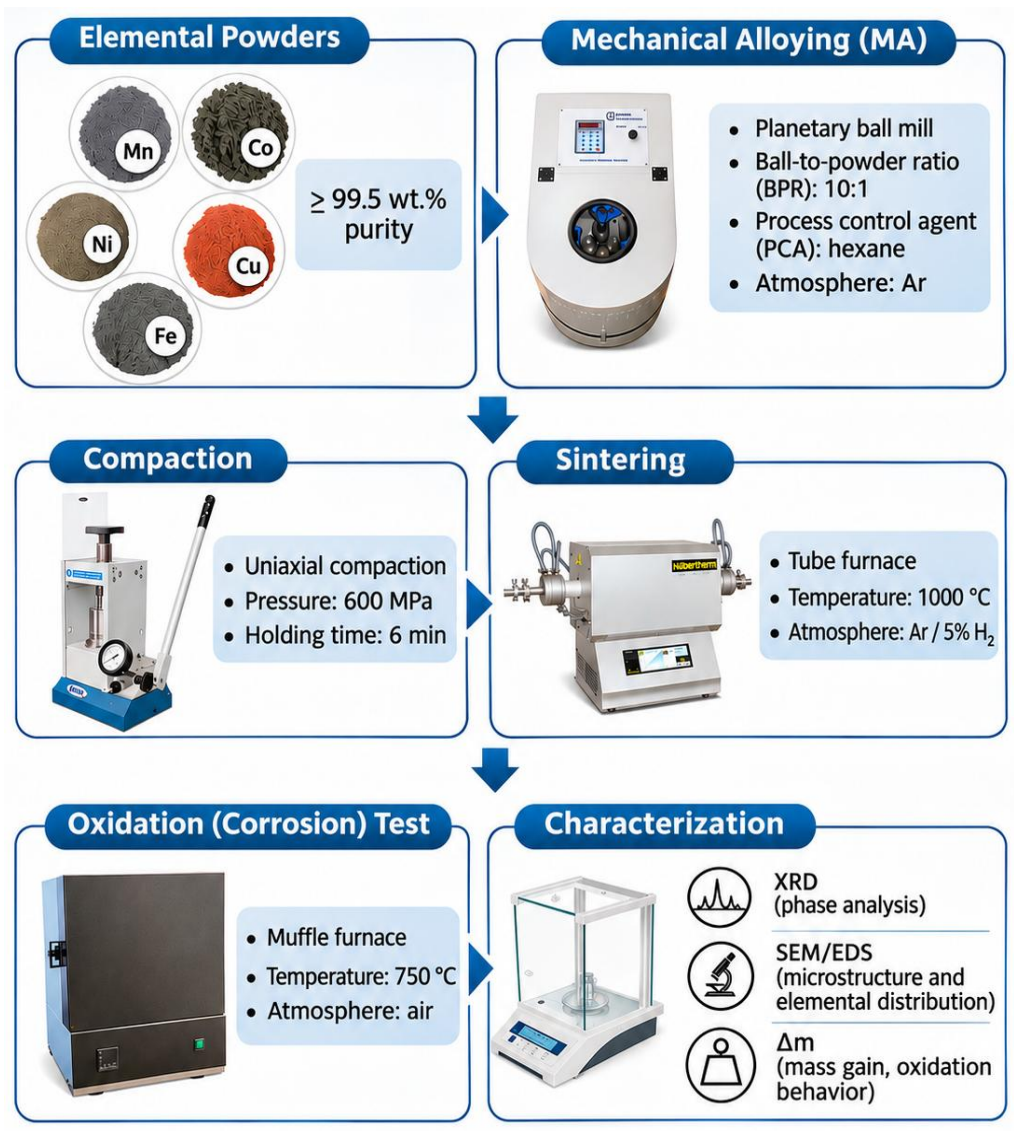
## Introduction

Metal-supported solid oxide fuel cells (MS-SOFCs) offer improved mechanical robustness, thermal shock resistance, and potentially lower manufacturing costs compared with conventional ceramic-supported systems [1]. High-entropy alloys (HEAs), composed of multiple principal elements in near-equiatomic proportions, can promote the formation of simple solid-solution phases. These alloys exhibit promising properties for high-temperature applications, including phase stability, mechanical strength, and oxidation and corrosion resistance [2,3]. However, their potential use as metallic supports in MS-SOFCs remains unexplored.

## Objective

To evaluate the high-temperature oxidation behavior of high-entropy alloys to assess their potential use as metallic supports in metal-supported solid oxide fuel cells (MS-SOFCs).

## Methodology




## Results and Discussion

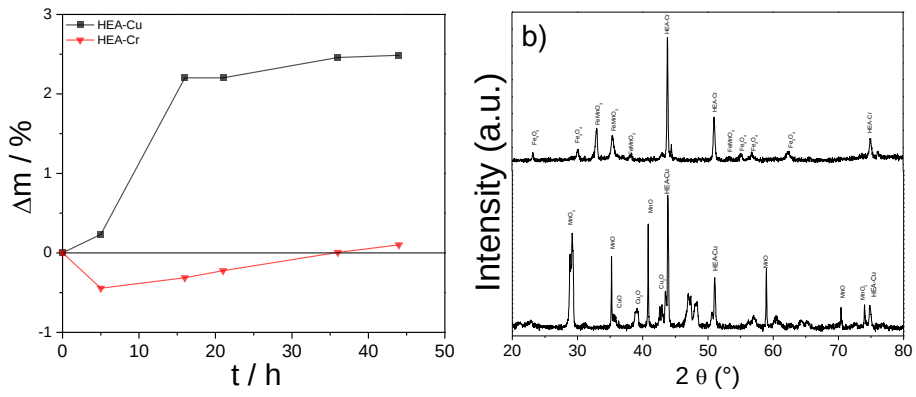



Figure 1. a) Mass change as a function of exposure time in air at 750 °C and b) post-exposure XRD patterns of HEA-Cu and HEA-Cr.

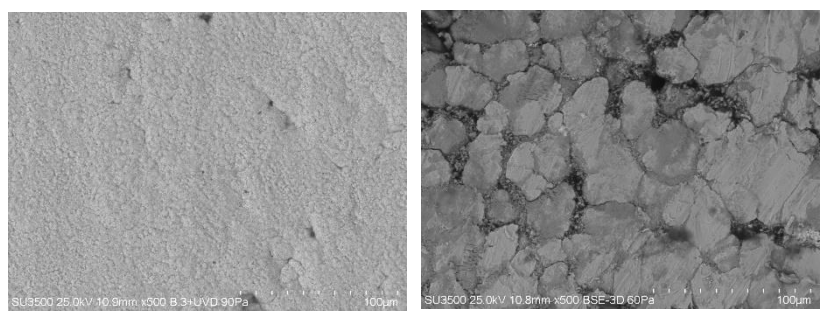


Figure 2. SEM images a) HEA-Cu and b) HEA-Cr after exposure to air at 750 °C

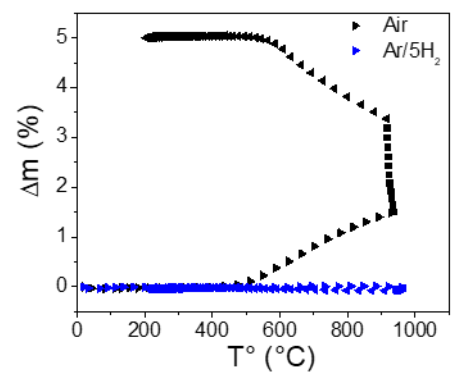



Figure 3. Thermogravimetric curves of HEA-Cu in air and Ar–5% $H_2$ up to 950 °C.

## Conclusions

After approximately 44 h in air at 750 °C, HEA-Cu gained about 2.5% in mass, whereas the net mass change of HEA-Cr remained close to zero. The two alloys showed different oxide phases in the post-exposure XRD patterns.

In thermogravimetric tests up to 950 °C, HEA-Cu gained approximately 5% in mass in air and showed negligible mass change in Ar–5% $H_2$.

The lower net mass change of HEA-Cr at 750 °C supports its further evaluation as a metallic support for MS-SOFCs. Oxide-scale integrity and long-term performance remain to be assessed.

## References

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