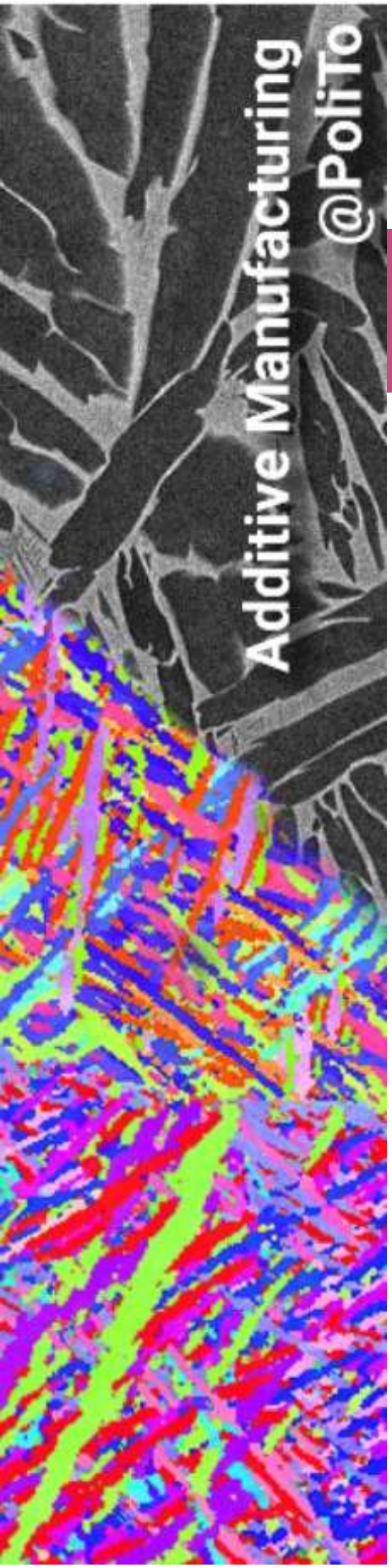
February 12th, 2026, 3:00 PM CEST

Aula Denina - Department of Applied Sciences and Technology DISAT



Nerea Ordás

Director of the Advanced Manufacturing in Powder Metallurgy and Laser group, Ceit (San Sebastián, Gipuzkoa, Spain)
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Advancing Materials for Fusion Energy: 25 Years of Research at Ceit

ABSTRACT

Over the past 25 years, the Ceit Research Centre has played a strategic role in advancing structural materials for fusion energy, supporting the roadmap of Europe toward safe and sustainable fusion power. Ceit focuses on applied, industry-oriented research and has contributed to numerous national and European programmes addressing materials able to withstand the extreme thermal, mechanical, and radiation conditions of fusion reactors such as ITER and DEMO. Its activities span the design, processing, and characterization of advanced metallic and ceramic materials for plasma-facing components and structural applications.

A key contribution is CEIT's development of an innovative production route for Oxide Dispersion Strengthened (ODS) alloys. To overcome the limitations of conventional Mechanical Alloying (MA), Ceit developed the **STARS® ROUTE** (Surface Treatment of gas Atomized powder followed by Reactive Synthesis), a trademarked process that eliminates the MA step. Using gas-atomized pre-alloyed powders with controlled oxygen introduction during densification, this route produces a clean, homogeneous dispersion of oxide nanoparticles, reducing processing time while improving scalability, ductility, and chemical purity. This innovation positions CEIT at the forefront of industrially viable ODS materials for fusion applications.

BIOGRAPHY

Nerea Ordás is Director of the Additive Manufacturing Group at Ceit, specializing in advanced metallic materials for demanding applications, particularly fusion energy systems. Her expertise covers powder metallurgy, additive manufacturing, joining technologies, and microstructural–mechanical characterization, with a focus on copper alloys and high-heat-flux components. She has contributed to multiple national and international fusion materials programmes and authored several peer-reviewed publications