



In-Situ Manufacturing of ODS FeCrAl Alloy via Selective Laser Melting

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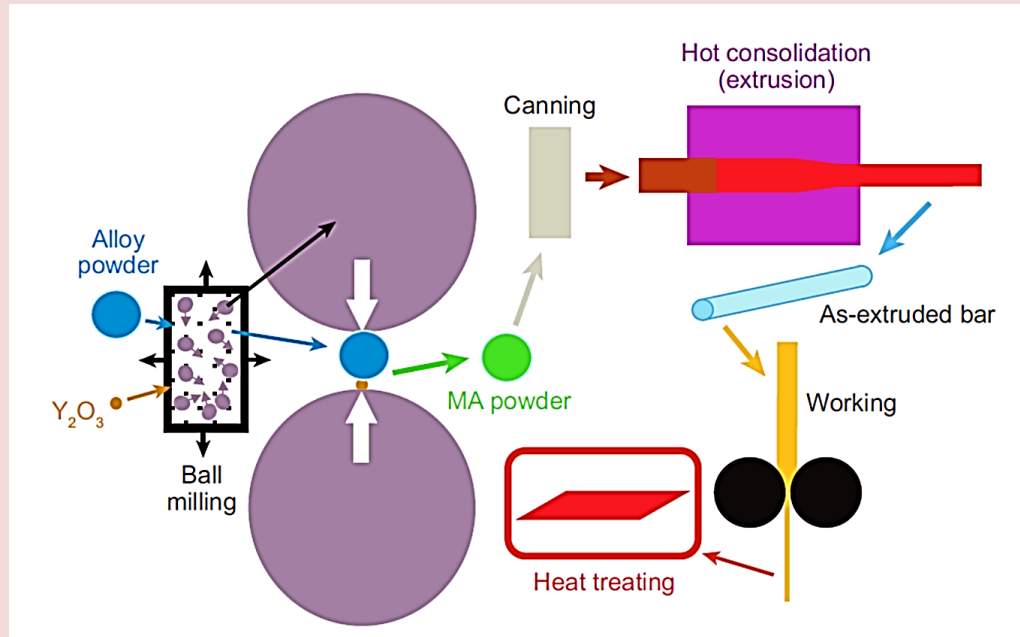
Virtual Engineering Showcase

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Why In-situ Manufacturing of ODS alloy via SLM?

Conventional Manufacturing:

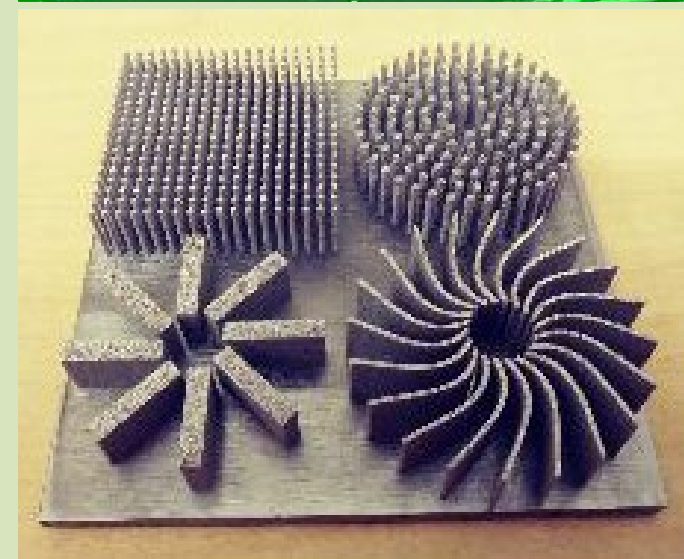
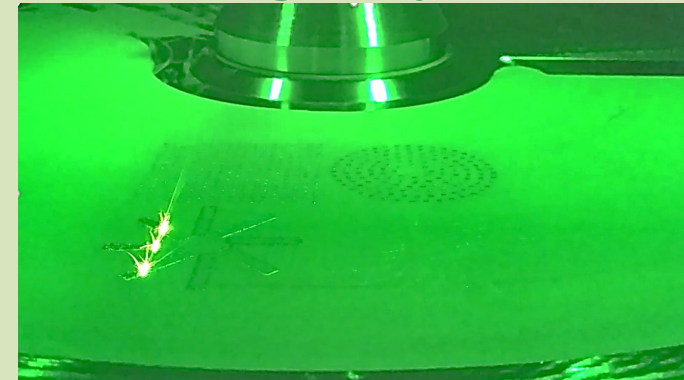
- Too many costly and time-consuming steps
- Contamination during mechanical alloying of oxide powder with matrix powder
- Heterogeneous distribution of nanoparticles



Conventional manufacturing of ODS alloys

Metal 3D Printing; Selective Laser Melting (SLM):

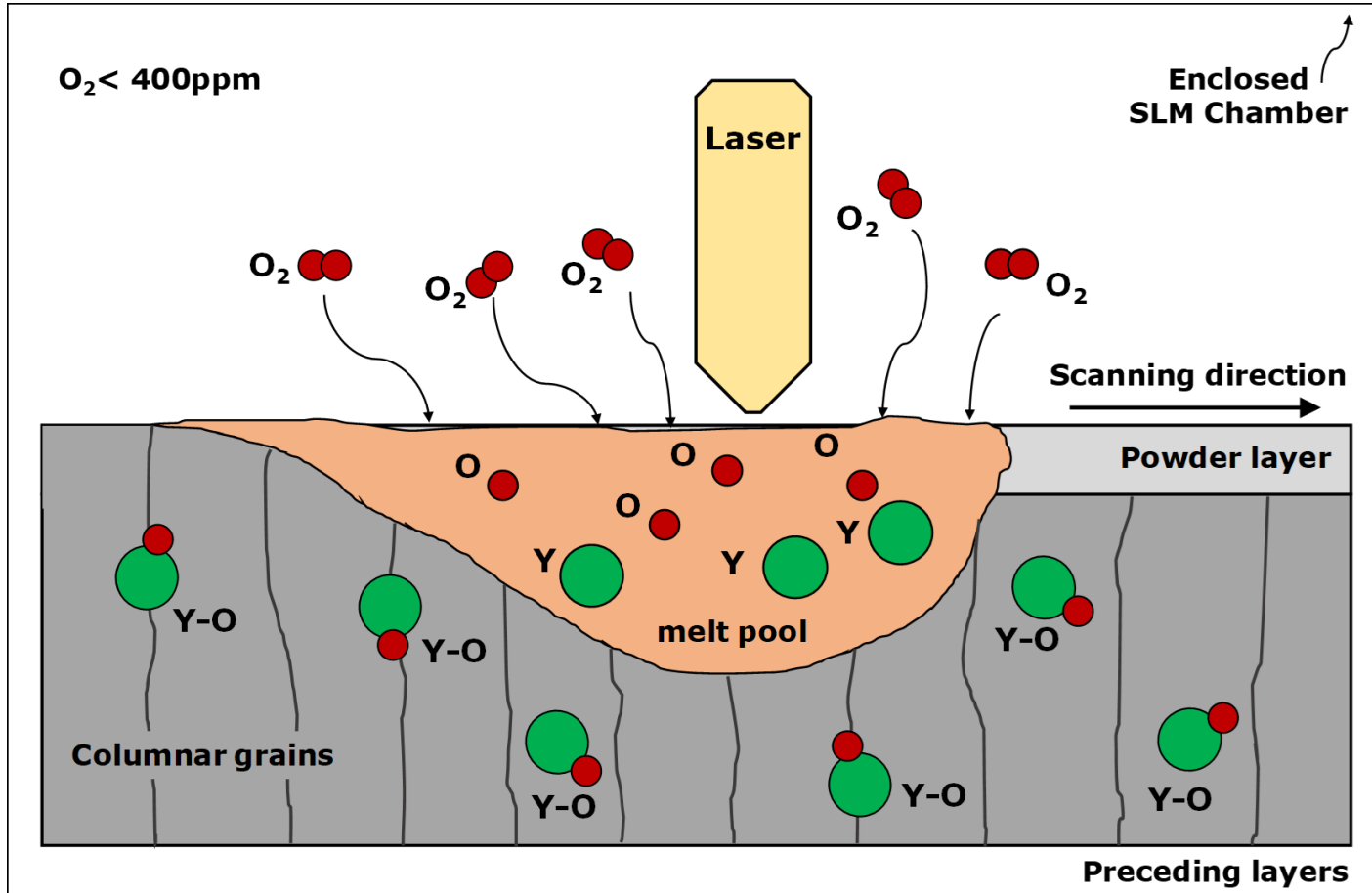
- One single step
- Refined microstructure with homogeneous distribution of nano-sized oxide precipitates which provide enhanced high-temperature strength



3D Printing- OR Creator Printer at PMAM Lab.

Vs.

How In-situ Manufacturing of ODS works?



Schematic of In-Situ Manufacturing of ODS FeCrAlY in SLM

You just need to use commercially available FeCrAlY powder in SLM printer

Make ODS FeCrAlY in presence of the residual oxygen inside the SLM chamber with no need for mechanical alloying of oxide powder (Y_2O_3) and metal powder (FeCrAl)

Project Details:

- ❑ **Objective:** Manufacturing of oxide dispersion strengthened (ODS) FeCrAlY alloy with only one step via 3D-printing
- ❑ **Material:** FeCrAlY powder
- ❑ **3D-printing Technology:** Selective Laser Melting (SLM)
- ❑ **Product:** ODS FeCrAlY alloy
- ❑ **Result:** formation of homogeneously distributed nano-sized oxide precipitates, enhanced mechanical properties compared to conventional manufactured specimens
- ❑ **Conclusion:** ODS FeCrAlY was successfully manufactured via SLM in only one step

**For more details on
technical results and
discussion see
provided poster
Thank you!**