Motivation:
- Titanium aluminides show superior mechanical properties (high strength, low density) at high temperatures thus they impose major improvements of efficiency in aerospace and automotive energy conversion processes.
- BUT: Presently large-scale application of TiAl suffers from high material cost
- TiAl is currently produced by VAR of compound electrodes made from titanium sponge, aluminium and master-alloys (e.g. NbAl, CrAl, etc.)
- Challenges in today’s production include homogeneous alloying of solid components and the high price of titanium sponge, as an energy intensive, strategic raw material.
- An alternative processing route was designed and has reached pilot scale, starting from readily available, cheap raw-materials.

Process idea:

Raw materials:
- TiO2 pigment
- alloying oxides
- aluminium granules
- booster

Liquid, homogeneous metal-melt

In-line-casting

Raw γ-TiAl electrode

Deoxidizing agent

Deoxidation by PESR

Primary γ-TiAl electrode

Refining by VAR

Final γ-TiAl ingot

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