International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI)

Balapur P.O., Hyderabad – 500005, Telangana, India

Powders for Additive Manufacturing

Overview

Additive manufacturing (AM) is fast emerging as a key manufacturing process to produce near–net shaped metallic components, where three dimensional components are built by adding the material layer by layer. While it is universally acknowledged that the quality of final AM component depends on the quality of the metallic powder that one starts with, the specific attributes of this powder quality are not understood. Additionally, the process yields in manufacturing of metallic powders for AM are generally very low (<20%). At present nickel–based superalloy powders (IN718, IN625 and CM247LC) for AM are being produced by a few reputed companies from USA, Switzerland, Germany, Canada and UK. However, each company produces its own tailor made powders with a given process. ARCI, having the state of the art inert gas atomiser facility is in the process of developing powders for AM.

Key Features

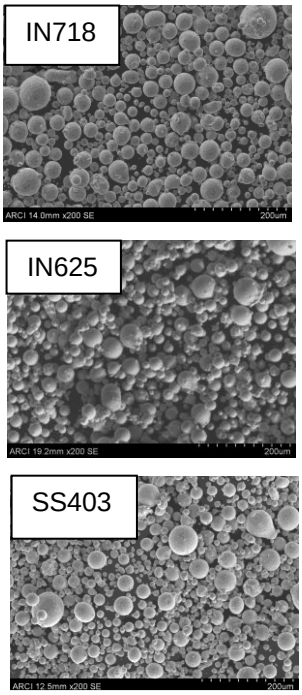
- Ease of manufacture of near–net shaped components by AM using powders
- Powder requirements are currently being met by imports and are expensive
- At present, there are no manufacturers of gas atomized powders in general, and Ni based superalloy powders, in particular, in India.
- Make in India

Potential Application Areas

- Aerospace
- Defence
- Biomedical
- Automobile

Technology Readiness Level 4

- Synthesis of powder (at 10 kg levels were demonstrated)
- Powders are undergoing trials on AM studies



SEM morphology of IN718, IN625 and SS403 powders produced at ARCI.

IPDI*	1	2	3	4	5	6	7	8	9	10
Activities	*Basic concepts and understanding of underlying scientific principles*	*Short listing possible applications*	*Research to prove technical feasibility for targeted application*	*Coupon level testing in stimulated conditions*	*Check repeatability/ consistency at coupon level*	*Prototype testing in real-life conditions*	*Check repeatability/ consistency at prototype level*	*Reassessing feasibility (IP, competition technology, commercial)*	*Initiate technology transfer*	*Support in stabilizing production*
Status										

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