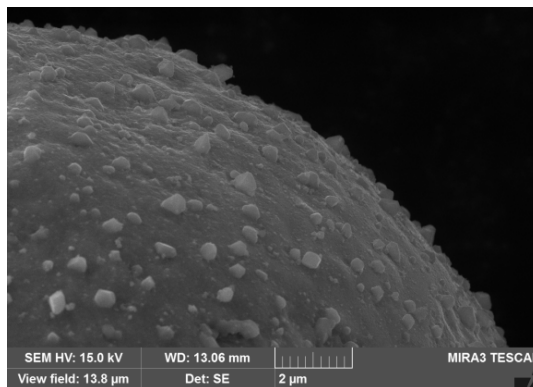


Method of changing the properties of surfaces of iron-based particles.

The technology enables modification of iron-based particles by depositing fine, secondary particles on their surfaces by means of diffusion. Such operation provides unique opportunity of changing the properties of surfaces in a whole batch of the powder or attaching functional, satellite particles.

BACKGROUND

The technology finds its use in improving processing of iron-based particles - this consists of but is not limited to Sintering process, MIM, Laser Powder Bed Fusion (L-PBF) and Direct Energy Deposition. It solves various technological challenges e.g. improving / changing properties of the surfaces of particles (wettability, roughness, hardness, composition and diffusion coefficient), easy fabrication of new alloys, preventing sedimentation of added compound, increasing homogeneous distribution of an addition and many others.



TECHNOLOGY

The technology consists of a method of depositing fine (nano- to micro-) particles on surfaces of already existing iron-based particles. The main elaborated metal alloy was 1.4404 and 1.4403 while the range of deposited particles contains elements like silicon, nickel, molybdenum, chromium and manganese. The size of particles suitable for deposition may vary depending on desired results and in between 100 nm and 10 µm. As a result of the process a multitude of types of compound particles can be created solving various technological challenges – e.g. improving wettability on the molten metal in L-PBF or improving the sintering kinetics in press-and-sinter processes. The deposition process is based on batch-processing approach and utilizes only standard, commercially available industrial devices and compounds. The processing steps have been extensively researched and are well described.

ADVANTAGES

The main advantages are as follows:

- A broad selection of particles can be deposited in a controlled way
- Deposited particles are uniformly distributed based on statistic distribution
- Deposited functional satellite-particles are diffusion bonded
- Utilizes standard and commercially available industrial equipment
- High throughput – hundreds of kilograms a day

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KEYWORDS:

Metal powders, surface, alloy, sintering, additive manufacturing.

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COOPERATION OPTIONS:

sale, licensing

DEVELOPMENT STATUS:

TRL 7 – technology demonstrated in industrial conditions.

STATUS OF PATENTS:

EP patent pending

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