Claims

1. A method of fabricating a graded metallic structure, the method comprising:

preparing a material powder in a supply container comprising a plurality of longitudinal volumes, the material powder partitioned into the longitudinal volumes and comprising different metallic powders in the longitudinal volumes, such that each longitudinal volume of the supply container comprises a respective metallic powder; and

performing an additive manufacturing process comprising:

supplying layers of the material powder from the supply container;

displacing the layers of material powder to a fabrication platform; and

fusing the layers of material powder on the fabrication platform to form the graded metallic structure,

wherein at least one longitudinal volume has a varying transverse cross-sectional area and at least one longitudinal volume has a varying longitudinal cross-sectional area, such that the fused metallic powders in the graded metallic structure are graded along the longitudinal and the transverse.

2. The method according to claim 1, wherein the longitudinal volumes are formed by a number of dividers, at least one divider being inclined to the longitudinal and at least one divider being inclined to the transverse.

3. The method according to claim 1 or 2, wherein preparing the material powder comprises:

inserting a number of dividers into the supply container to form the longitudinal volumes;

filling the longitudinal volumes with the respective metallic powders; and

removing the dividers from the supply container.

4. The method according to claim 3, wherein the dividers comprise a central divider coincident with a centreline of the supply container.

5. The method according to claim 4, wherein the central divider is inclined to the transverse.

6. The method according to any one of claims 3 to 5, wherein the dividers comprise a number of side dividers offset from a centreline of the supply container.

7. The method according to claim 6, wherein at least one side divider is inclined to the longitudinal.

8. The method according to any one of claims 3 to 7, wherein insertion of the dividers is facilitated by a support structure substantially congruent with an inner perimeter of the supply container.

9. The method according to claim 8, wherein the support structure comprises a set of guides to facilitate insertion of the dividers.

10. The method according to any one of claims 1 to 9, wherein preparing the material powder comprises preparing the metallic powders for the respective longitudinal volumes, each metallic powder comprising a first metallic material and optionally a second metallic material.

11. The method according to claim 10, wherein each metallic powder comprises the first metallic material and the second metallic material, and wherein preparing the metallic powder comprises mixing the first metallic material with the second metallic material by roller milling.

12. The method according to claim 10 or 11, wherein preparing the metallic powder comprises forming the first metallic material by gas atomization.

13. The method according to any one of claims 10 to 12, wherein the first metallic material comprises a high entropy alloy.

14. The method according to any one of claims 10 to 13, wherein each metallic powder comprises the first metallic material and the second metallic material, and wherein the second metallic material comprises titanium and/or aluminium.

15. The method according to any one of claims 1 to 14, wherein the additive manufacturing process is laser powder bed fusion.