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High-entropy alloy powders for additive manufacturing

增材制造用高熵合金粉

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Foreword

This document complies with the regulations of GB/T 1.1-2020 "Standardization Work Guidelines Part

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High-entropy alloy powder for additive manufacturing

1 Scope

China's national standard for high-entropy alloy powders used in additive manufacturing. High-entropy alloys abandon the assumption that has governed metallurgy since it began - that an alloy is one principal metal with additions - and use five or more elements in near-equal proportions. The configurational entropy of such a mixture stabilises a single solid solution phase where intuition predicts a mess of brittle intermetallics, and the resulting materials show combinations of strength, ductility at cryogenic temperature and corrosion resistance that conventional alloys do not reach. Additive manufacturing suits them particularly well: the rapid solidification of a laser melt pool suppresses the segregation that makes these alloys hard to cast, and printing avoids the difficulty of machining them. A powder standard is the practical precondition, since the composition must be right in every particle rather than on average.

2 Normative reference documents

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, the dated quotations For undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to this document.

GB/T 1479.1 Determination of bulk density of metal powders Part

GB/T 1480 Metal powder dry screening method for particle size determination

GB/T 1482 Standard funnel method for determination of flowability of metal powders (Hall flow meter)

GB/T 5162 Determination of tap density of metal powders

GB/T 5314 Powder sampling method for powder metallurgy

GB/T 19077 Particle size distribution laser diffraction method

GB/T 35351 Additive Manufacturing Terminology

3 Terms and definitions

The terms and definitions defined in GB/T 35351 apply to this document.

4 Brands and classifications

Products are divided into five brands according to their chemical composition. FeCoNiCrMn, FeCoNiCrAl, FeCoNiCrTi, FeCoNiCrMo, and FeCoNiCr Number. According to the particle size range, it is divided into two categories. Class I and Class II.

5 Technical requirements

5.1 Chemical composition The chemical composition of the product should comply with the requirements in Table 1.

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