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Rare earth AB5-type hydrogen storage alloy powder for the negative electrode of nickel metal hydride batteries

金属氢化物-镍电池负极用稀土系AB5型贮氢合金粉

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Issued by: General Administration of Quality Supervision, Inspection and Quarantine;
Standardization Administration of the PRC

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Foreword

This standard by the National Standardization Technical Committee of rare earth (SAC/TC229) centralized. This standard by the Inner Mongolia XiAoKe hydrogen storage alloy Ltd. is responsible for drafting. This standard Nonferrous Metal Research Institute, Guangzhou, Xiamen Tungsten Co., Ltd., Baotou Rare Earth Research Institute, Beijing Hongfu Source Technology Co., Division participated in the drafting. The main drafters of this standard. Zhu Xi Lin, Han Shumin, Li Peiliang, Gao Wei, Zhang Yongjian, Zhu Guirong, Yan Huizhong. Metal hydride - Nickel Battery negative electrode Rare earth based AB5 type hydrogen storage alloy powder

1 Scope

China's national product standard for the rare earth AB5-type hydrogen storage alloy powder used as the negative electrode material of nickel metal hydride batteries. It specifies the designations, the requirements, the test methods, the inspection rules and the marking, packaging, transport and storage. The NiMH battery works by storing hydrogen in a metal rather than by consuming a metal, and this powder is where the hydrogen goes. An AB5 alloy - lanthanum-rich mischmetal on the A side, nickel with cobalt, manganese and aluminium on the B side - absorbs hydrogen into its lattice as a metal hydride on charge and releases it on discharge, reversibly, thousands of times. It is the material that replaced cadmium in rechargeable cells and made the hybrid car battery possible, and although lithium-ion has taken the high-energy applications, NiMH remains in use where robustness, safety and tolerance of abuse matter more than energy density. What the standard controls is what determines how the powder behaves in a cell. The composition first, because the substitutions on the B site are what set the plateau pressure at which hydrogen is absorbed and released - too high and the cell loses hydrogen, too low and the capacity is not accessible - and they also govern the corrosion resistance in the alkaline electrolyte, which is what limits cycle life. Then the particle size distribution and the surface, since the reaction happens at the surface and the powder cracks progressively as it expands and contracts on every cycle. And the impurities, the oxygen content and the storage capacity itself, measured as the pressure-composition isotherm. Issued on 14 January 2011 and in force

since 1 November 2011.

This standard specifies the metal hydride - battery cathode Nickel requirements with rare earth based AB5 type hydrogen storage alloy powder, test methods, inspection rules and Signs, packaging, transportation and storage. This standard applies to the use of vacuum induction melting process of production of rare earth based AB5 type hydrogen storage alloy powder. For metal hydride - Nickel Battery The anode material.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version suitable for use herein Member. For undated references, the latest edition (including any amendments) applies to this document. Determination of

GB/T 1479.1 metal powder bulk density - Part 1. funnel method Determination of

GB/T 5162 metal powder tap density

GB/T 19077.1 laser diffraction particle size analysis - Part 1. General YS/T 484 Nickel-metal hydride battery with a hydrogen-absorbing alloy negative electrode capacity ratio measurement

3 Requirements

3.1 grades and electrochemical properties Grades and electrochemical performance should meet the requirements of Table 1. Demand side, such products have special requirements, supply and demand sides can be negotiated. Table

1 Grade Type Electrochemical performance (25 °C ± 2 °C) Specific capacity/(mAh/g) Cycle life/Ci 300mA/g Discharge capacity/(mAh/g) 207,000 ordinary >=310 >=500 >=275 207,001 Power type >=300 >=500 >=285 207 002 high capacity type >=330 >=300 >=280

3.2 Physical properties

3.2.1 particle size distribution and density Particle size distribution and density should be in accordance with Table 2, the demand side, if there are special requirements, supply and demand sides can be negotiated.