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Space environment - Test method of space radiation effects for space materials

空间环境 航天材料空间辐射效应试验方法

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents.

This document was proposed by the Chinese Academy of Sciences.

This document is under the jurisdiction of the National Technical Committee for Standardization of Aerospace Technology and Its Applications (SAC/TC425).

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Space environment and space radiation effects of aerospace materials Test methods

1 Scope

This document describes the test methods for the effects of space radiation on aerospace materials.

This document applies to the single-factor environmental effects and multi-factor environmental synergy of aerospace materials in space radiation environments such as electrons, protons, and ultraviolet radiation.

Ground simulation test of the effect.

2 Normative references

GB/T 32452

GB/T 41543

GB/T 42846-2023

3 Terms and Definitions

The terms and definitions defined in GB/T 32452, GB/T 41543 and GB/T 42846-2023 apply to this document.

4.1 Purpose of the Test

Obtain aerospace materials that can withstand performance changes in radiation environments such as electrons, protons, and ultraviolet rays.

4.2 Test Principle

Place aerospace materials in a ground simulation environment, and use ground simulation of electrons, protons, gamma rays, etc. according to the principle of equivalent effect simulation.

Dose depth distribution in the material (according to the requirements of Appendix C of GB/T 42846-2023) and dose depth of space energy particles in the material The distribution is equivalent, using a specific light source to simulate the radiation of ultraviolet radiation on the material in space, and the material is subjected to the test before, during or after the test.

It can conduct in-situ or ex-situ testing to obtain the changes in the performance of

aerospace materials due to space radiation.

Taking the electron, proton and ultraviolet comprehensive irradiation simulation test as an example, the test device and irradiation simulation are shown in Figure 1.