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**NATIONAL STANDARD OF THE
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**C-Si photovoltaic(PV) modules - Light and elevated temperature
induced degradation (LETID) test - Detection**

晶体硅光伏组件 光热诱导衰减 (LETID) 试验 检测

(English Translation)

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Foreword

This document is a standard or guiding technical document.

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents". Drafting.

This document is equivalent to IEC TS63342:2022 "Test for photothermal induced degradation (LETID) of crystalline silicon photovoltaic modules".

The component type has been changed from IEC technical specifications to my country's

national standardization guidance technical documents.

The following minimal editorial changes have been made to this document.

---References in international standards have been removed.

Introduction

This document aims to evaluate the photothermal induced degradation (LETID) effect in crystalline silicon photovoltaic modules by injecting current at high temperatures.

The phenomenon is caused by excess carrier excitation at high temperatures above 50°C through light or injected current. In outdoor use, LETID... It takes months or even years to form, while boron oxide (BO) decays in the opposite way, taking only a few days. LETID decays more... A slow recovery phase. This document only uses the current injection method to detect LETID.

This document does not discuss BO and iron-boron (Fe-B) related degradation phenomena, which occur rapidly under room temperature and light conditions.

O-defects can affect test results. This document attempts to separate them through specific steps, but the separation effect may not be perfect. Fe-B defects.

The impact is eliminated by introducing a settling time before the power is determined.

The test procedures specified in this document can be used to reveal the sensitivity of a sample to the LETID decay mechanism, but cannot accurately measure its outdoor performance.

The actual degradation situation outdoors. The degree and time scale of outdoor degradation depend on the climate and component technology.

In this document, considering the test equipment, the LETID test employs the relatively simple current injection method. Compared to the illumination method, current injection... This method allows for easier control of testing conditions, thus ensuring comparability between different laboratories. Identical lighting conditions (i.e., the same temperature and excess current) are applied.

Sub-density/injection level will produce comparable results.

The stress conditions in this document differ at the injection level from the battery test method described in IEC TS63202-4. IEC TS63202-4 This document aims to provide rapid quality inspection for known batteries and can be used for outgoing or incoming inspection of specific products. The test procedures in this document are designed to provide A general, product-independent LETID detection method that can be applied under conditions where the battery status within a component is unknown, and produces reliable results. Repeated results.

1 Scope

This document describes the test method for photothermal induced degradation (LETID) of crystalline silicon photovoltaic modules, including instrumentation, sample preparation, and testing.

Procedures, results processing, and report content, etc.

This document applies to crystalline silicon photovoltaic modules and is used to reveal the sensitivity of samples to the LETID degradation mechanism, but it cannot accurately measure its sensitivity to LETID degradation.

Actual outdoor degradation. The extent and timescale of outdoor degradation depend on the climate and component technology.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies. This document.

GB/T 9535.1-2025 Design qualification and type approval of terrestrial photovoltaic modules - Part 1: Test requirements (IEC 61215-1) 2021, IDT)

GB/T 9535.2-2025 Design qualification and type approval of terrestrial photovoltaic modules - Part 2: Test procedures (IEC 61215-2) 2021, IDT)

Note: GB/T 2297-2025 Terminology for Solar Photovoltaic Energy Systems (IEC TS61836:2016, NEQ)

Note: GB/T 9535.1-2025 Design qualification and type approval of ground-mounted photovoltaic modules - Part 1: Test requirements (IEC 61215-1:2021, IDT)

Note: GB/T 9535.2-2025 Design qualification and type approval of ground-mounted photovoltaic modules - Part 2: Test procedures (IEC 61215-2:2021, IDT)

ISO /IEC Guide 98-3:2008 Measurement uncertainty - Part 3: Guidelines for the expression of measurement uncertainty

Note: GB/T 27418-2017 Evaluation and expression of measurement uncertainty (ISO /IEC Guide 98-3:2008 MOD)

3 Terms and Definitions

The terms and definitions defined in IEC TS61836, IEC 61215-1 and IEC 61215-2, as well as the following terms and definitions, apply to this document.

The URLs for the terminology databases maintained by ISO and IEC for standardization are as follows.

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