International Standard

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Atomic layer deposition — Chemical characteristics and related process specifications of atomic layer deposition precursors

Dépôt de couches atomiques — Caractéristiques chimiques et spécifications de processus associées des précurseurs pour le dépôt de couches atomiques

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Foreword

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Introduction

Advances in nanotechnology have led to higher requirements for thin film deposition technology. Atomic layer deposition (ALD) technology has broad application prospects in the field of photovoltaic, semiconductor, flexible electronics, micro-electromechanical systems (MEMS), catalysis and optical devices, etc., with its unique advantages, such as precise and controllable film thickness, excellent uniformity and good step coverage.

ALD precursors are critical to film quality and performance. The continuous expansion of precursors provides more options for the preparation of high-quality films with specific needs in terms of composition, uniformity, step coverage and electrical properties. In the absence of a standard to regulate ALD precursor grades, the industry has not formed a unified standard for the purity detection and quality control of the precursors, leading to various criteria of precursor qualities. This document provides an evaluation index and testing methods of ALD precursors to serve the rising demand of the ALD market. This document provides standards, methods and regulations to the ALD field internationally, including precursor development and production, process exploration and application development in both industry and academia.

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Atomic layer deposition — Chemical characteristics and related process specifications of atomic layer deposition precursors

1 Scope

This document defines the chemical characteristics and related process specifications of atomic layer deposition precursors, including assay content, metal purity and anion content specification.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 8181, *Atomic layer deposition — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 8181 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
precursor
reaction source used in atomic layer deposition process

3.2
assay
quantitative content (by moles) of a substance in a product

3.3
metal purity
percentage of metal content (by weight) after subtracting the sum of all the metal impurities from 100 %

3.4
anion content
percentage of negatively charged ions (by weight)

3.5
film uniformity
variation in film properties, particularly the thickness, across the surface of a flat substrate

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