

Development Research of Apparatus for Artificial Lattice Utilizing Sputtering and Ion-Plating Combined Technique

メタデータ	言語: jpn 出版者: 公開日: 2021-08-26 キーワード (Ja): キーワード (En): 作成者: Hata, Tomonobu メールアドレス: 所属:
URL	http://hdl.handle.net/2297/00063542

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2001 Fiscal Year Final Research Report Summary

Development Research of Apparatus for Artificial Lattice Utilizing Sputtering and Ion-Plating Combined Technique

Research Project

Project/Area Number

11555086

Research Category

Grant-in-Aid for Scientific Research (B)

Allocation Type

Single-year Grants

Section

展開研究

Research Field

Electronic materials/Electric materials

Research Institution

Kanazawa University

Principal Investigator

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Project Period (FY)

1999 - 2001

Keywords

Sputtering / Thin Film / Metallic Mode / High-k Material / Limited Reaction / ZrO₂ / MOSFET

Research Abstract

A new sputtering film deposition method, named Limited Reaction Sputtering Technique, was developed and investigated. Using this technique, ZrO₂ dielectric films were synthesized for gate materials of next generation MOSFETs. The Si substrate surface oxidation was suppressed consequently a high specific dielectric constant as high as over 20 was obtained. On conventional sputtering technique using oxide target, oxygen ions and radicals are easily to be generated, thus Si is oxidized significantly. However, this technique does not generate them, resulting in clear interface between Si substrate and deposited films.

Research Products (16 results)

All	Other
All	Publications

- [Publications] K.Sasaki et al.: "Limited Reaction Growth of YSZ Thin Films for Gate Insulator"Vacuum. 66. 457-462 (2002) ✓
- [Publications] K.Sasaki, T.Hata: "Metallic Mode Growth of ZrO₂-Based Thin Films for Gate Insulator Using Reactive Sputtering Technique"Ext. Abs. 2001 AWAD. 93-97 (2001) ✓
- [Publications] K.Sasaki et al.: "Limited Reaction Growth of YSZ Thin Films for Gate Insulator"Proc. of ISSP. 41-44 (2001) ✓
- [Publications] K.Sasaki, H.Hata: "Reactive Growth of YSZ Thin Films with Unpoisoned Sputtering Target"Abs. of Joint Workshop of 29th IUVSAT. 381-389 (2000) ✓
- [Publications] T.Hata et al.: "Surface and Interface of Heteroepitaxially Grown YSZ on (100), (110), (111) Si Substrate by Reactive Sputtering"Abs. IJC-Si. PI-29 (1999) ✓
- [Publications] M.Nagashima: "Growth Dependence of Reactive Sputtering Yttria-Stabilized Zirconia on Si(100), (110), (111)"Jpn. J. Appl. Phys.. 38. L74-L77 (1999) ✓
- [Publications] Kimihiro Sasaki, Tatsuhiro Hasu, Kenji Sasaki, Tomonobu Hata: ""Limited Reaction Growth of YSZ(ZrO₂ : Y₂O₃) Thin Films for Gate Insulator"Vacuum. in press. ✓
- [Publications] K.Sasaki, T.Hata: "Metallic Mode Growth of ZrO₂-Based Thin Films for Gate Insulator Using Reactive Sputtering Technique"2001 AWAD. 93-97 (2001) ✓
- [Publications] K.Sasaki, T.Hasu, K.Sasaki, T.Hata: "Limited Reaction Growth of YSZ (ZrO₂:Y₂O₃) Thin Films for Gate Insulator"Proc. Of ISSP. 41-44 (2001) ✓
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- [Publications] T.Hata K.Sasaki, Y.Ichikawa, M.Nagashima, K.sasaki: "Surface and Interface of Heteroepitaxially Grown Yttria-Stabilized Zirconia (YSZ) on (100), (110), (111) Si Substrates by Reactive Sputtering"Program & Abstracts. IJC-Si. PI-29 (1999) ✓
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- [Publications] M.Nagashima, S.Nakano, K.Sasaki, T.Hata: "Growth Dependence of Reactive Sputtered Yttria-Stabilized Zirconia on Si (100), (110), (111) Substrates"Jpn. J. Appl. Phys. 38, Part2, [1A/B]. L74-L77 (1999) ✓
- [Publications] K.Kawai, T.Hasu, K.Monju, R.Izumi, K.Sasaki, T.Hata: "Growth of ZrO₂ and Gate Insulation Film Characteristics by Limited-Reaction Sputtering"Tech. Rep. Of IEICE. SDM2002-62. 27-31 (2002) ✓
- [Publications] K.Sasaki, T.Hasu, K.Sasaki, T.Hata: "Preparation of YSZ Ultra thin Film for Gate Insulator Films by Metal/Oxide Mode"Tech. Rep. Of IEICE. CPM2000-123. 39-44 (2000) ✓

URL: https://kaken.nii.ac.jp/report/KAKENHI-PROJECT-11555086/115550862001kenkyu_seika_hokoku