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(54) **LAMINATED SUBSTRATE OF SILICON SINGLE CRYSTAL AND GROUP III NITRIDE SINGLE CRYSTAL WITH OFF ANGLE**

LAMINIERTES SUBSTRAT AUS EINEM SILIZIUMEINKRISTALL UND EINEM
GRUPPE-III-NITRID-EINKRISTALL UNTER EINEM WINKEL

SUBSTRAT STRATIFIÉ DE MONOCRISTAL DE SILICIUM ET DE MONOCRISTAL DE NITRURE DU
GROUPE III PRÉSENTANT UN ANGLE DE DÉCALAGE

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(56) References cited:

JP-A- H0 864 913	JP-A- H11 260 835
JP-A- 2000 247 789	JP-A- 2002 050 585
JP-A- 2003 332 242	JP-A- 2004 051 446
JP-A- 2007 096 331	JP-A- 2008 227 338

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US-A1- 2009 246 944

- STACIA KELLER ET AL: "Growth and characterization of N-polar GaN and AlGaIn/GaN HEMTs on (111) silicon", PHYSICA STATUS SOLIDI (C), vol. 8, no. 7-8, 9 July 2011 (2011-07-09), pages 2086-2088, XP055092906, ISSN: 1862-6351, DOI: 10.1002/pssc.201000958
- K. SAITO ET AL: "Measurement of misorientation of AlN layer grown on (111)Si for freestanding substrate", PHYSICA STATUS SOLIDI (C), vol. 6, no. S2, 14 June 2009 (2009-06-14), pages S293-S296, XP055092831, ISSN: 1862-6351, DOI: 10.1002/pssc.200880787
- LEE W ET AL: "Growth and structural characteristics of GaN/AlN /nanothick [gamma]-Al₂O₃/Si(111)", JOURNAL OF VACUUM SCIENCE AND TECHNOLOGY: PART B, AVS / AIP, MELVILLE, NEW YORK, NY, US, vol. 26, no. 3, 30 May 2008 (2008-05-30), pages 1064-1067, XP012114229, ISSN: 1071-1023, DOI: 10.1116/1.2905241
- WAKAHARA A ET AL: "Organometallic vapor phase epitaxy of GaN on Si(111) with a gamma-Al₂O₃(111) epitaxial intermediate layer", JOURNAL OF CRYSTAL GROWTH, ELSEVIER, AMSTERDAM, NL, vol. 236, no. 1-3, March 2002 (2002-03), pages 21-25, XP004339641, ISSN: 0022-0248, DOI: 10.1016/S0022-0248(01)02090-5