(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
21 June 2007 (21.06.2007)

PCT

(10) International Publication Number
WO 2007/068756 A1

(51) International Patent Classification:
C30B 29/40 (2006.01) *H01L 21/20* (2006.01)
C30B 25/02 (2006.01)

(21) International Application Number:
PCT/EP2006/069767

(22) International Filing Date:
15 December 2006 (15.12.2006)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/751,387 15 December 2005 (15.12.2005) US

(71) Applicant *(for all designated States except US)*: **LUMILOG** [FR/FR]; Les Moulins 2720 Chemin De Saint Bernard, F-06220 Vallauris (FR).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **BEAUMONT, Bernard** [FR/FR]; 46, domaine de l'Istre, Avenue de l'Hôtel de Ville, F-06530 Le Tignet (FR). **FAURIE, Jean-Pierre** [FR/FR]; 200, Impasse des Chênes, F-06560 Valbonne (FR). **GIBART, Pierre** [FR/FR]; 284 Chemin du Plan de Clermont, F-06740 Chateauneuf Grasse (FR).

(74) Agent: **SCHRIMPF, WARCOIN, AHNER, TEXIER, LE FORESTIER, CALLON DE LAMARCK, COLLIN, TETAZ-Cabinet Regimbeau**; 20, Rue De Chazelles, F-75847 Paris Cedex 17 (FR).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:
— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:
— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 2007/068756 A1

(54) **Title:** PROCESS FOR GROWTH OF LOW DISLOCATION DENSITY GAN

(57) **Abstract:** High quality free standing GaN is obtained using a new modification of the Epitaxial Lateral Overgrowth technology in which 3D islands or features are created only by tuning the growth parameters. Smoothing these islands (2D growth) is achieved thereafter by setting growth conditions producing enhanced lateral growth. The repetition of 3D-2D growth results in multiple bending of the threading dislocations thus producing thick layers or free standing GaN with threading dislocation density below 10^6 cm^{-2}.