



(51) International Patent Classification:

C30B 15/10 (2006.01) C30B 15/20 (2006.01)
C30B 15/14 (2006.01) C30B 29/16 (2006.01)

(21) International Application Number:

PCT/EP2023/051212

(22) International Filing Date:

19 January 2023 (19.01.2023)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

22154305.1 31 January 2022 (31.01.2022) EP

(71) Applicant: SILTRONIC AG [DE/DE]; Einsteinstr. 172
Tower B / Blue Tower, 81677 München (DE).(72) Inventors: GALAZKA, Zbigniew; Katharina-Boll-Dorn-
berger-Str. 24, 12489 Berlin (DE). GANSCHOW, Ste-
ffen; Kollwitzstr. 86, 10435 Berlin (DE). BICKER-
MANN, Matthias; Mackebenweg 38, 12355 Berlin (DE).
SCHRÖDER, Thomas; Max-Born-Str. 2, 12489 Berlin
(DE). HÄCKL, Walter; Fasanenstr. 7, 84558 Kirchwei-
dach (DE).(74) Agent: HÄCKL, Walter; Siltronic AG, Johannes-Hess-
Str. 24, 84489 Burghausen (DE).

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

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, CV,
GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ,
TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU,
TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE,
DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU,
LV, MC, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI,
SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, KM, ML, MR, NE, SN, TD, TG).

(54) Title: METHOD AND APPARATUS FOR PRODUCING ELECTRICALLY CONDUCTING BULK β -GA₂O₃ SINGLE CRYSTALS AND ELECTRICALLY CONDUCTING BULK β -GA₂O₃ SINGLE CRYSTAL

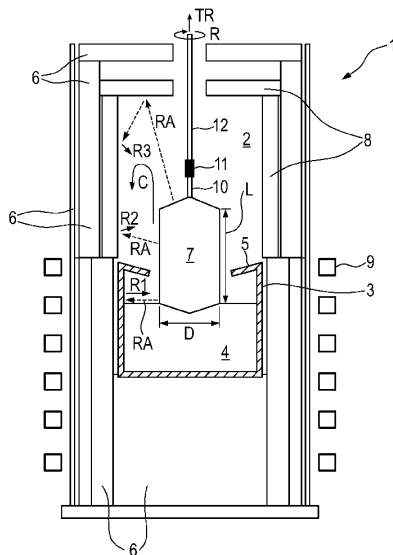


Fig. 1

(57) Abstract: Method and apparatus for producing electrically conducting bulk β -GA₂O₃ single crystals grown from the melt, especially by the Czochralski method. To grow the β -GA₂O₃ single crystals (7) of high electrical conductivity and large diameter, larger than one inch, combined with the length exceeding 25 mm, the growth furnace is provided with an inner thermal insulation (8) of low radiative reflectivity (R) in the near infrared spectral region of 1 – 3 μ m that decreases reflections of heat back to the growing single crystal (7) and thus increases the heat dissipation from the growing single crystal (7). Low reflectivity can be achieved either by high emissivity or high transmittivity. Additionally, the β -GA₂O₃ single crystal (7) is grown at a rate that dynamically decreases as the growth proceeds, to dynamically decrease the latent heat of crystallization and the amount of the heat to be dissipated from the growing single crystal (7).

Published:

— *with international search report (Art. 21(3))*