



(51) International Patent Classification:

C30B 15/04 (2006.01) C30B 29/06 (2006.01)
C30B 15/20 (2006.01) C30B 33/02 (2006.01)

(21) International Application Number:

PCT/US2022/077268

(22) International Filing Date:

29 September 2022 (29.09.2022)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/254,337 11 October 2021 (11.10.2021) US

(71) Applicant: **GLOBALWAFERS CO., LTD.** [CN/CN];
No. 8, Gongye E. 2nd Rd., East District, Hsinchu City,
30075 (TW).

(72) Inventors: **HUDSON, Carissima Marie**; 501 Pearl Drive,
St. Peters, Missouri 63376 (US). **RYU, JaeWoo**; 501
Pearl Drive, St. Peters, Missouri 63376 (US). **SEACRIST,
Michael Robbin**; 501 Pearl Drive, St. Peters, Missouri
63376 (US).

(74) Agent: **SCHUTH, Richard A.** et al.; ARMSTRONG
TEASDALE LLP, 7700 Forsyth Blvd., Suite 1800, St.
Louis, Missouri 63105 (US).

(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, ME, 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, 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, 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).

Published:

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

(54) Title: MODELING THERMAL DONOR FORMATION AND TARGET RESISTIVITY FOR SINGLE CRYSTAL SILICON
INGOT PRODUCTION

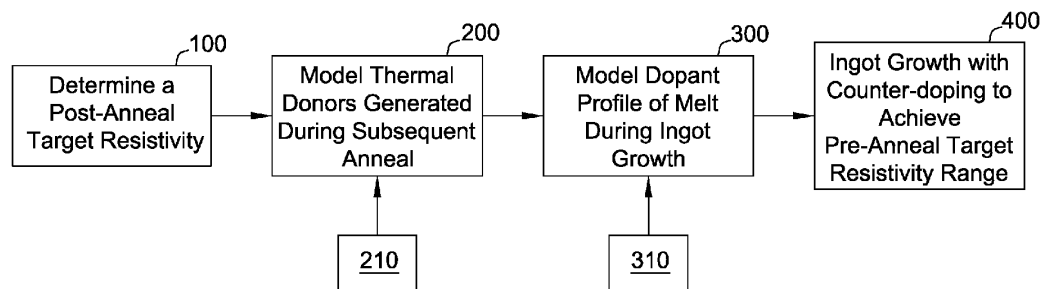


FIG. 1

(57) Abstract: Methods for producing single crystal silicon ingots are disclosed. The methods may involve modeling formation of thermal donors and target resistivity during downstream annealing processes such as during subsequent device manufacturing such as manufacturing of interposer devices. The model may output a pre-anneal wafer resistivity target range. The single crystal silicon ingot production process may be modeled to determine a counter-doping schedule to achieve the pre-anneal wafer resistivity target range across a longer length of the main body of the ingot.