

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
16 December 2021 (16.12.2021)



(10) International Publication Number
WO 2021/252276 A1

(51) International Patent Classification:

H01L 21/687 (2006.01) *C23C 16/458* (2006.01)
H01L 21/67 (2006.01) *H05B 3/14* (2006.01)

(21) International Application Number:

PCT/US2021/035835

(22) International Filing Date:

04 June 2021 (04.06.2021)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/036,650 09 June 2020 (09.06.2020) US

(71) Applicant: **LAM RESEARCH CORPORATION**
[US/US]; 4650 Cushing Parkway, Fremont, California
94538 (US).

(72) Inventor: **LIND, Gary B.**; 13998 Lodgepole Ct, Penn Val-
ley, California 95946 (US).

(74) Agent: **WIGGINS, Michael D.** et al.; HARNESS, DICK-
EY & PIERCE, P.L.C., 5445 Corporate Drive, Suite 200,
Troy, Michigan 48098 (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, CZ, DE, DJ, DK, DM, DO,
DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,
HR, HU, ID, IL, IN, IR, IS, IT, 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,

(54) Title: PEDESTAL THERMAL PROFILE TUNING USING MULTIPLE HEATED ZONES AND THERMAL VOIDS

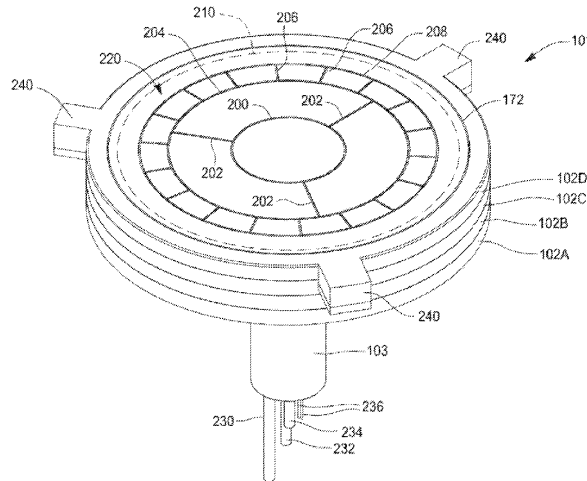


FIG. 2

(57) Abstract: A substrate support includes a body and a thermal void. The body is configured to support a substrate during processing of the substrate. The body includes plates including a top plate, a first intermediate plate, a second intermediate plate and a bottom plate. The plates are arranged to form a stack. The first intermediate plate is disposed on the second intermediate plate. The thermal void is defined by an upper surface of the second intermediate plate and at least one of a lower surface of the first intermediate plate or a lower surface of the top plate. The thermal void is annular-shaped.

[Continued on next page]

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).

Declarations under Rule 4.17:

- *of inventorship (Rule 4.17(iv))*

Published:

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*