



(51) International Patent Classification:

H01L 21/67 (2006.01) G05B 13/04 (2006.01)
G05B 23/02 (2006.01) G06N 20/00 (2019.01)

(21) International Application Number:

PCT/US2022/043531

(22) International Filing Date:

14 September 2022 (14.09.2022)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

17/476,408 15 September 2021 (15.09.2021) US

(71) Applicant: **APPLIED MATERIALS, INC.** [US/US];
3050 Bowers Avenue, Santa Clara, California 95054 (US).

(72) Inventors: **RAO, Preetham Prahallada**; 3050 Bowers
Avenue, Santa Clara, California 95054 (US). **KOTHNUR,
Prashanth**; 3050 Bowers Avenue, Santa Clara, California
95054 (US).

(74) Agent: **KIMES, Benjamin A.** et al.; LOWENSTEIN SAN-
DLER LLP, One Lowenstein Drive, Roseland, New Jersey
07068 (US).

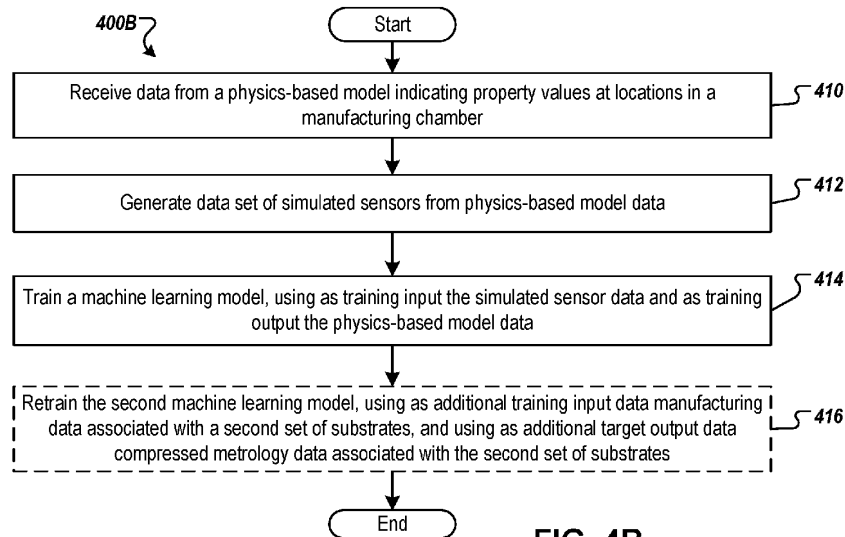
(81) Designated States (unless otherwise indicated, for every

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).

(54) Title: VIRTUAL MEASUREMENT OF CONDITIONS PROXIMATE TO A SUBSTRATE WITH PHYSICS-INFORMED COMPRESSED SENSING



(57) Abstract: A method includes measuring a subset of property values within a manufacturing chamber during a process performed on a substrate within the manufacturing chamber. The method further includes determining property values in the manufacturing chamber at locations removed from the locations the measurements are taken. The method further includes performing a corrective action based on the determined properties.

[Continued on next page]

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 (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))*