



(51) International Patent Classification:

A61K 9/50 (2006.01) B01J 2/00 (2006.01)
A61J 3/00 (2006.01)

(21) International Application Number:

PCT/US2020/048196

(22) International Filing Date:

27 August 2020 (27.08.2020)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

62/892,465 27 August 2019 (27.08.2019) US

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

(72) Inventor: **NEIKIRK, Colin C.**; 621 Tasman Drive, Apt.
2216, Sunnyvale, California 94089 (US).

(74) Agent: **MEIKLEJOHN, Anita L.** et al.; Fish &
Richardson P.C., P.O. Box 1022, Minneapolis, Minnesota
55440-1022 (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,

(54) Title: VAPOR PHASE COATING TECHNOLOGY FOR PHARMACEUTICAL ABUSE DETERRENT FORMULATIONS

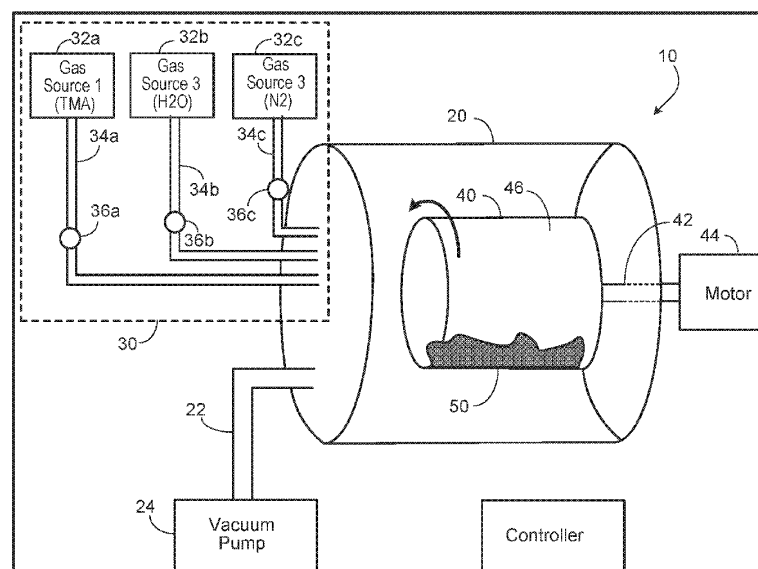


FIG. 1

(57) Abstract: A method of preparing an abuse deterrent pharmaceutical composition having a drug-containing core enclosed by one or more metal oxide materials is provided. The method includes the sequential steps of (a) loading the particles comprising the drug into a reactor, (b) applying a vaporous or gaseous metal precursor to the particles in the reactor, (c) performing one or more pump-purge cycles of the reactor using inert gas, (d) applying a vaporous or gaseous oxidant to the particles in the reactor, and (e) performing one or more pump-purge cycles of the reactor using inert gas. This produces an abuse deterrent pharmaceutical composition comprising a drug containing core enclosed by one or more metal oxide materials.

[Continued on next page]

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).

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))*