



(51) International Patent Classification:

C23C 16/18 (2006.01) C07F 15/00 (2006.01)

C23C 16/455 (2006.01)

(21) International Application Number:

PCT/EP2020/083152

(22) International Filing Date:

24 November 2020 (24.11.2020)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

62/940,524 26 November 2019 (26.11.2019) US

(71) Applicant: **MERCK PATENT GMBH** [DE/DE]; Frankfurt Straße 250, 64293 Darmstadt (DE).(72) Inventors: **LIU, Guo**; 70 Meister Avenue, Branchburg, New Jersey 08876 (US). **LEHN, Jean-Sébastien M.**; 70 Meister Avenue, Branchburg, NJ 08876 (US). **DEZELAH, Charles**; 70 Meister Avenue, Branchburg, NJ 08876 (US). **WOODRUFF, Jacob**; 70 Meister Avenue, Branchburg, NJ 08876 (US). **COYLE, Jason P.**; 70 Meister Avenue, Branchburg, NJ 08876 (US).(74) Agent: **RIPPEL, Hans Christoph**; Patentanwälte Isenbruck Bösl Hörschler PartG mbB, Seckenheimer Landstraße 4, 68163 Mannheim (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, 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, 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: RUTHENIUM PYRAZOLATE PRECURSOR FOR ATOMIC LAYER DEPOSITION AND SIMILAR PROCESSES

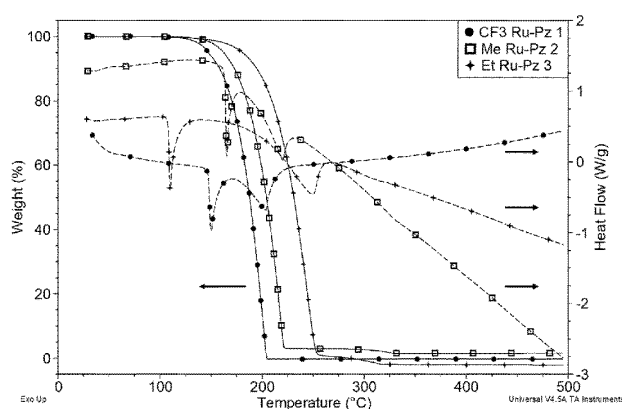


Figure 1

(57) **Abstract:** The disclosed and claimed subject matter relates to the ruthenium pyrazolate precursors and derivatives thereof as well as their uses in ALD or ALD-like processes and the films grown in such processes. In particular substituted unsaturated pyrazolate bridged diruthenium carbonyl complexes are disclosed.