

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
13 June 2024 (13.06.2024)



(10) International Publication Number
WO 2024/123527 A1

(51) International Patent Classification:

<i>B01J 37/02</i> (2006.01)	<i>B01J 23/66</i> (2006.01)
<i>B01J 37/08</i> (2006.01)	<i>B01J 23/89</i> (2006.01)
<i>B01J 35/53</i> (2024.01)	<i>B01J 23/52</i> (2006.01)
<i>B01J 35/40</i> (2024.01)	<i>B01J 37/16</i> (2006.01)
<i>B01J 35/45</i> (2024.01)	<i>B01J 27/228</i> (2006.01)
<i>B01J 35/30</i> (2024.01)	<i>B01J 27/057</i> (2006.01)
<i>B01J 27/224</i> (2006.01)	<i>B01J 37/03</i> (2006.01)
<i>B01J 35/50</i> (2024.01)	<i>C07C 67/40</i> (2006.01)
<i>B01J 35/00</i> (2024.01)	<i>C07C 69/54</i> (2006.01)
<i>B01J 23/68</i> (2006.01)	<i>B01J 21/14</i> (2006.01)

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, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, 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, ME, 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).

(21) International Application Number:

PCT/US2023/080435

(22) International Filing Date:

20 November 2023 (20.11.2023)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/431,037 08 December 2022 (08.12.2022) US

(71) Applicants: **DOW GLOBAL TECHNOLOGIES LLC** [US/US]; 2211 H.H. Dow Way, Midland, Michigan 48674 (US). **ROHM AND HAAS COMPANY** [US/US]; 400 Arcola Road, Collegeville, Pennsylvania 19426 (US).

(72) Inventors: **LEE, Wen -Sheng**; 693 Washington Street, 1776 Building, Midland, Michigan 48640 (US). **LIM-BACH, Kirk W.**; 400 Arcola Road, Collegeville, Pennsylvania 19426 (US). **SUSSMAN, Victor J.**; 2211 H.H. Dow Way, Midland, Michigan 48674 (US). **KIRILIN, Alexey**; Herbert H. Dowweg 5, 4542 NM Hoek (NL).

(74) Agent: **MUTSCHLER, Brian**; The Dow Chemical Company, Intellectual Property, P.O. 1967, Midland, Michigan 48641-1967 (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, MG, MK, MN, MU, MW, MX, MY, MZ, NA,

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))



WO 2024/123527 A1

(54) Title: PROCESS FOR MAKING SUPPORTED GOLD NP CATALYST FOR THE PRODUCTION OF METHYL METHACRYLATE BY OXIDATION ESTERIFICATION, CATALYST OBTAINED THEREBY AND PROCESS OF SAID OE

(57) Abstract: A process for making a catalyst for oxidative esterification of methacrolein to methyl methacrylate comprises providing a support selected from an oxide of silicon, a carbide of silicon, a metal oxide, and a metal carbide. Particles of at least one oxide of a metal are provided on the support. The support is contacted with a gold salt and heated at a temperature ranging from 50°C to 600°C for a time ranging from at least 0.1 h to 48 h to convert the gold salt to gold nanoparticles having an average diameter of less than 12 nm and a standard deviation of +/- 4 nm, where at least 75% by number of the gold nanoparticles are positioned within 20 nm of a particle of the oxide of the metal.