

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
26 September 2024 (26.09.2024)



(10) International Publication Number
WO 2024/194694 A3

(51) International Patent Classification:

C01F 17/10 (2020.01) C01F 17/224 (2020.01)
C01F 17/206 (2020.01) C01F 17/229 (2020.01)
C01F 17/218 (2020.01)

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.

(21) International Application Number:

PCT/IB2024/000166

(22) International Filing Date:

25 March 2024 (25.03.2024)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/491,805 23 March 2023 (23.03.2023) US

(71) Applicant: **NEO PERFORMANCE MATERIALS (SINGAPORE) PTE. LTD.** [SG/SG]; #01-19 The Galen, 61 Science Park Road, Singapore Science Park III, Singapore 117525 (SG).

(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).

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))

(88) Date of publication of the international search report:

21 November 2024 (21.11.2024)

(72) Inventors: **NG, Szu, Hwee**; C/o Neo Performance Materials(singapore) Pte. Ltd., #01-19 The Galen, 61 Science Park Road, Singapore Science Park III, Singapore 117525 (SG). **YAN, Yong**; C/o Neo Performance Materials(singapore) Pte. Ltd., #01-19 The Galen, 61 Science Park Road, Singapore Science Park III, Singapore 117525 (SG). **LIU, Shijia**; C/o Neo Performance Materials(singapore) Pte. Ltd., #01-19 The Galen, 61 Science Park Road, Singapore Science Park III, Singapore 117525 (SG). **LIEW, Jia, Onn**; C/o Neo Performance Materials(singapore) Pte. Ltd., #01-19 The Galen, 61 Science Park Road, Singapore Science Park III, Singapore 117525 (SG). **HSU, Benedict**; C/o Neo Performance Materials(singapore) Pte. Ltd., #01-19 The Galen, 61 Science Park Road, Singapore Science Park III, Singapore 117525 (SG).

(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, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO,

(54) Title: MONODISPERSED SPHERICAL RARE EARTH OXIDES

$$D = \frac{6000}{SSA \times \rho} \quad (I)$$

(57) Abstract: A composition comprising monodispersed spherical rare earth oxide particles having an average particle size of about 20 nm to about 300 nm. The rare earth oxide particles of this composition have a calculated particle size diameter D in nm: Formula (I) where SSA is BET surface area in m²/g and p is density in g/cm³, that is less than about 25% different than the observed particle size diameter measured by SEM. The rare earth particles can be Dy₂O₃, Ho₂O₃, La₂O₃, and Y₂O₃ particles. This composition has beneficial properties for ceramic and electronic uses. Processes for making these particles and uses of these particles are further included.



WO 2024/194694 A3