

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

(19) World Intellectual Property
Organization

International Bureau

(43) International Publication Date
09 July 2020 (09.07.2020)



(10) International Publication Number
WO 2020/142125 A3

(51) International Patent Classification:
C04B 35/482 (2006.01) C09D 1/00 (2006.01)

(21) International Application Number:
PCT/US2019/055423

(22) International Filing Date:
09 October 2019 (09.10.2019)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
62/743,392 09 October 2018 (09.10.2018) US

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(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, 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, SM, ST, SV, SY, TH, TJ, TM, TN,
TR, TT, TZ, UA, UG, US, UZ, VC, VN, 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).

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))
- of inventorship (Rule 4.17(iv))

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:
20 August 2020 (20.08.2020)



WO 2020/142125 A3

(54) Title: HIGH-ENTROPY OXIDES FOR THERMAL BARRIER COATING (TBC) TOP COATS

(57) Abstract: A thermal barrier coating (TBC) top coat which is a high entropy oxide (HEO) having a high configurational entropy, contains at least 5 different oxide-forming metallic cations, is a single phase or single crystalline structure, such as tetragonal or cubic over unexpectedly wide temperature ranges up to and beyond top coat operating temperatures of preferably at least 2300°F. The TBC top coats exhibit low thermal conductivity, good sintering resistance, excellent phase stability and good thermal cycling performance. At least five of the different oxide-forming metallic cations include: a) at least one of the transition metals: Sc, Y, Ti, Zr, V, Nb, Ta, Cr, Mo, W, Mn, Re, Fe, Ru, Co, Ni, Cu, or Zn, and/or at least one of the lanthanides La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Yb, or Lu. One of the at least five different oxide-forming metallic cations may also comprise at least one of the alkaline-earth metals: Be, Mg, Ca, Sr, or Ba.