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(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.



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