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(71) Applicant: **PRAXAIR S.T. TECHNOLOGY, INC.**
[US/US]; 441 Sackett Point Road, North Haven, CT 06473
(US).

(72) Inventors: **BELOV, Irina**; 9402 Greenfield Lane,
Zionsville, IN 46077 (US). **TANG, Zhihong**; 12720 Bran-
denburg Dr., Carmel, IN 46032 (US). **PERPALL, Mark,**
W.; 5315 N. Delaware St., Indianapolis, IN 46220 (US).
COPELAND, Daryl, G.; 1269 N. Matthews Road, Green-
wood, IN 46143 (US). **FITZWATER, Brian, D.**; 2898 Ea-
gles Crest Circle B, Indianapolis, IN 46214 (US).

(74) Agent: **DALAL, Nilay, S.** et al.; Linde Inc., 10 Riverview
Drive, Danbury, CT 06810 (US).

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(54) Title: CHROMATE-FREE INORGANIC COATING SYSTEMS FOR HOT CORROSION PROTECTION OF SUPERALLOY SUBSTRATE

(57) Abstract: Hexavalent chromium-free slurry formulations which are suitable in the production of inorganic overlay coating systems are described. The formulations provide superior hot corrosion and high-temperature oxidation protection for superalloy substrates. A basecoat slurry and topcoat slurry are provided. The basecoat slurry includes an aluminum phosphate based aqueous solution having a molar ratio of A1:P higher than about 1 :3 with the incorporation of pigments of either metallic particles, or metal oxide particles, or both in combination. The topcoat slurry includes an aluminum phosphate based aqueous solution having a molar ratio of A1:P higher than about 1 :3. An inorganic overlay coating formed on substrate made from the slurry formulation of present invention for hot corrosion protection on superalloy substrate against hot corrosion. Furthermore, a multilayer coating comprises a metallic bond coat and an inorganic overlay coating formed on superalloy substrate to further enhance high-temperature oxidation and hot corrosion protection.



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