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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 Al: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 Al: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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