

Title (en)

METHOD OF INCREASING CORROSION RESISTANCE OF METALS AND ALLOYS BY TREATMENT WITH RARE EARTH ELEMENTS

Title (de)

VERFAHREN ZUR ERHÖHUNG DER KORROSIONSBESTÄNDIGKEIT VON METALLEUND LEGIERUNG DURCH BEHANDELNMIT SELTENEN ERDE-ELEMENTEN

Title (fr)

PROCEDE DE TRAITEMENT A BASE D'ELEMENTS TERRES RARES POUR AMELIORER LA RESISTANCE A LA CORROSION DES METAUX ET ALLIAGES

Publication

EP 0797691 A1 19971001 (EN)

Application

EP 95933276 A 19951010

Priority

- CA 9500565 W 19951010
- GB 9420295 A 19941007

Abstract (en)

[origin: WO9611290A1] There is provided a method for treating the surface of metals such as ferritic steels, austenitic stainless steels, copper and aluminum alloys to increase their corrosion resistance. The metals are immersed into a heated aqueous composition containing a rare earth salt. Increased corrosion resistance is obtained using nitrates of yttrium, gadolinium, cerium, europium, terbium, samarium, neodymium, praseodymium, lanthanum, holmium, ytterbium, dysprosium, and erbium nitrates. The rare earth salt is present in the range from about 2% by weight to saturation of the solution. The composition includes a pH-modifying substance such as nitric acid to adjust the pH in the range 0.5 to about 6.5 to attack the surface to remove oxides facilitating deposition of the rare earth. For aluminum alloys the pH is maintained between 4.5 to 6.5, for nickel based alloys and austenitic stainless steels the pH is maintained between 0.5 to 3.5 and between pH 2.0 to 4.5 for ferritic stainless steels. The surface can also be conditioned by abrasion before or during immersion in the composition. Increased corrosion resistance is achieved by immersion for 15 to 20 minutes with the composition maintained between 60 to 95 DEG C. Gadolinium, neodymium and praseodymium nitrate when used alone produced the greatest degree of corrosion resistance compared to the other rare earth nitrates. Significant synergistic effects are observed when combinations of two or more rare earth nitrates are used in the compositions. Compositions based on cerium nitrate, gadolinium nitrate and lanthanum nitrate are very effective in reducing crevice corrosion.

IPC 1-7

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IPC 8 full level

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CPC (source: EP KR)

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Citation (search report)

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