ABSTRACTS

1. **Waterline corrosion of zinc electrodes in silver-zinc cells —**

R. C. Misra, Ram Narain and B. R. Vasudeva Rao (Electro-Technology, **7**, No. 1, 17, 1963). This article discusses the study of water line corrosion observed in silver-zinc battery, and reports the work done in this regard, and a new fabrication technique in which zinc grids and terminal posts can be used without the risk of water line corrosion of the negative plates, thereby avoiding the use of silver, copper and other such materials for the terminal posts to prevent local action.

2. **A review of cathodic protection theory and practice for newcomers and old-timers alike —**

L. P. Sudrabin (Materials Protection, **2**, No. 5, 8, 1963). A review with 36 references.

3. **Inhibition of the corrosion of aluminium-copper alloy in hydrchloric acid solutions —**

K. G. Sheth and T. L. Rama Char (Werkstoffe Und Korrosion, **14**, 465, 1963). The inhibition of the corrosion of aircraft aluminium-copper alloy in hydrochloric acid solutions has been studied with acridine, nicotinic acid, strychnine and quinine hydrochloride. The efficiencies are in the range 20-98, 78-99, 60-99 and 58-98 per cent for the substances in the above order. Polarization studies with quinine hydrochloride show that the anode polarization is low, whereas the cathode polarization is considerable. The Tafel plot holds good in this case. The dissolution of the metal is electrochemical in character, and it is possible to obtain cathodic protection by impressed current. The corrosion process with quinine hydrochloride appears to be under cathodic control. Seven figures and 26 references.

4. **Corrosion problems arising in naval ships —**

B. N. Hall (Corrosion Prevention and Control, **10**, No. 6, 49, 1963). Impingement attack, cavitation attack, dezincification and dealuminification, crevice attack, galvanic corrosion, stress corrosion, corrosion fatigue, atmospheric attack; 8 references.

5. **Corrosion engineering and corrosion science —**

M. G. Fontana (Corrosion, **19**, 199t, 1963). This is based on a plenary lecture presented at the Second International Congress on Metallic Corrosion, 1963. It stresses the view that the corrosion scientist and corrosion engineer are complimentary; their efforts are synergistic in solving problems of corrosion control. Eleven figures and 6 references.

6. **Effect of platinum, copper and iron ions on corrosion and passivity of titanium in 15 per cent hydrochloric acid —**

N. D. Tomashov and R. M. Al' tovskii (Corrosion, **19**, 217t, 1963). Cations of more noble metals, particularly platinic, cupric and ferric, cause a shift in metal potential in the positive direction, enhancing the cathodic process and resulting in anodic passivity of titanium in 15 per cent hydrochloric acid. One table, 3 figures and 14 references.

7. **Linear polarization measurements in the study of corrosion inhibition —**

R. A. Legault and M. S. Walker (Corrosion, **19**, 222t, 1963). The linear polarization method has been found very rapid and convenient for studying rate changes and evaluating corrosion inhibitors. It has also made possible observations of the synergistic effects that may exist between inhibitor and environment. Eight figures and 5 references.

8. **The anodic protection of steel. A review of recent progress —**

J. Hill (Platinum Metals Review, **7**, No. 3, 94, 1963). This article summarizes the basic principles of the technique and describes the substantial success obtained in these field trials reported up to the present time. Eight references.

9. **The training of corrosion engineers and scientists —**

W. T. White (Australasian Corrosion Engineering, **7**, No. 6, 9, 1963). Introduction, general, importance of corrosionists, recommendations.

10. Maintenance to prevent corrosion in a chemical factory —

P. Johnson (Australasian Corrosion Engineering, **7**, No. 6, 13, 1963). Surface coatings to prevent corrosion, corrosion reduction by more suitable materials.

11. Al-Zn-In alloy anode for cathodic protection —

T. Sakano and K. Toda (Boshoku Gijutsu, **11**, 486, 1962; Chem. Abs., **58**, 13,434, 1963). The anodic current efficiency of aluminium alloy anodes containing 0.01-0.02 per cent indium and 0.5-5 per cent zinc exceeded 80 per cent at a current density greater than 1 ma/sq. cm. The efficiency of 99.85 per cent aluminium containing small amounts of iron and silicon was better than pure aluminium, but 0.01 per cent copper caused marked deterioration of the performance. In actual tests the alloy anodes were not as good at a current density less than 1 ma/sq. cm., but above 1-1.5 ma/sq. cm. they were quite satisfactory and showed a current output about 4 times that of an aluminium anode containing 5 per cent zinc. The anodic potential of the first named alloy was about — 1.1 volt with reference to the saturated calomel electrode.

12. Corrosion prevention in the nuclear power industry in the United Kingdom —

C. W. Brewer (Australasian Corrosion Engineering, **7**, No. 7, 9, 1963). A review of the methods used for preventing metallic corrosion in the nuclear power industry in the United Kingdom. Firstly the nature of nuclear fission reactions is discussed briefly, to give an understanding of the difficult requirements in selecting materials of construction for a nuclear reactor. Then the corrosion problems involved in the gas-cooled graphite-moderated reactor, in the pressurized-water reactor, and in the fast-neutron breader reactor respectively, are discussed. One table, 2 figures and references.

13. Dissolution of steel and adsorption of hydrogen by steel during acid pickling in presence of inhibitor —

A. K. Lahiri, N. G. Banerjee and T. Banerjee (NML Tech., J., **5**, No. 2, 33, 1963). Introduction, testing procedure, estimation of hydrogen absorbed, effect of time and inhibitor — urea, thiourea and di-o-tolyl thiourea, discussion. Ten figures and 6 references.

14. Science for electroplaters 80. Chromium allotropes, 81, Chromium-cracks and pores —

L. Serota (Metal Finishing, **61**, No. 6, 99; No. 7, 66; No. 8, 61, 1963). B.C.C. chromium, hexagonal modification, trivalent chromium, heat treatment, crystal structure; crystal orientation, hydrides; deposit thickness, elongation.

15. Rhenium plating —

(Products Finishing, **27**, No. 9, 54, 1963). The plating of rhenium is expensive, but the metal has properties that are valuable particularly in aerospace work. The phosphate bath is being marketed for production applications.

16. Gold plating with spray guns —

G. S. Gomes and D. J. Levy (Products Finishing, **27**, No. 10, 37, 1963). Two water-based solutions combine to form a mirror-like gold plate on metals or non-metals. The new plating technique is similar to silvering by chemical reduction. It involves simultaneous spraying at room temperature of the two solutions, one containing gold and the other the chemical reducing agent. The gold deposits at the rate of 5 microinches per minute when 1 fl. oz. per minute of each solution is sprayed. The process has several advantages, and offers interesting possibilities in the manufacture of aerospace hardware as well as for mirrors, picture frames, window signs and electronics applications.

17. Gas plating — An introduction —

C. E. MacNeill (Metal Finishing, **61**, No. 7, 40, 1963). Introduction; definitions; plating reactions, techniques, equipment and applications. Three tables, 2 figures and 12 references.

18. Periodic reverse plating. Review of recent literature —

J. W. Dini (Metal Finishing, **61**, No. 7, 52, 1963). Introduction, PR plating—characteristics, properties of deposits, production applications, additional information on processes, plating of rare and unusual metals. Two tables, 1 figure and 87 references.

19. Zinc-nickel alloy electroplated coatings. Corrosion protection of steel —

L. Domnikov (Metal Finishing, **61**, No. 8, 49, 1963). Deposits from cyanide electrolytes contain about 2 per cent nickel and from the ammoniacal solutions up to 30 per cent nickel. Coatings with 10-20 per cent nickel possess the highest protective properties. Three tables, 2 figures and 11 references.

20. **The behaviour of copper anodes during the electrodeposition of copper in acid baths —**

T. Zak (Trans. Inst. Metal Finishing, **40**, pt. 3, 104, 1963). Satisfactory behaviour of copper anodes as described in literature is reviewed — particularly the purity of the anodes and its influence on conductivity. The analysis of potentials and conditions of dissolution of copper anodes over a range of phosphorus contents is described.

21. **Engineering applications of electrochemistry-4. Electroplating in the printing industry —**

H. Cann (Metal Finishing J, **9**, 315, 1963). Letterpress, photogravure, lithography, earlier electrotype methods, producing copper cylinders.

22. **Electronic thicknessmeter for electrodeposits. Parts 1 and 2 —**

U. H. Narayanan, K. Sundararajan and S. B. Shenoy (Electroplating and Metal Finishing, **16**, 256, 1963). Anodic behaviour of deposited metals in specific stripping solutions; the instrument. Twelve figures and 2 tables.

23. **Measuring plating thickness and determining metal content in plating baths by x-ray fluorescence —**

A. F. Mohrnheim (Plating, **50**, 725, 1963). The instrumentation and principles of x-ray measurements are reviewed, and the method applied to gold plating for the electronics industry as a practical working example. Ten figures and 15 references.

24. **Electroforming cobalt and cobalt alloys —**

F. R. Morral (Plating, **50**, 732, 1963). Electroforming baths, properties of electroformed cobalt-tungsten and cobalt—tungsten—nickel alloys; 36 references.

25. **Aluminium coatings on iron and steel —**

F. C. Porter (Metal Finishing J, **9**, 303, 1963). This article outlines the methods of processing for each type of aluminium-coated steel, nature of the coatings formed, chemical physical and mechanical properties of the laminates and the service performance where known. The special merits of each type of aluminium coating are indicated together with the types of finish that can be applied to each aluminium surface. Selected applications indicate the commercial scope of each type of aluminium-coated steel. Thirtytwo references.

26. **Progress in electric heat-treatment furnaces —**

D. M. Dovey (Metallurgical Reviews, **8**, No. 29, 1-39, 1963). Introduction, resistor furnaces, salt-baths, induction heating, heat-treatment processes; 152 references.

27. **Recent heat treatment furnace installations —**

(Metallurgia, **67**, 271, 1963). Annual survey of developments: introduction, reheating furnaces, stress relieving furnaces, annealing and normalising, carburising and nitriding furnaces, hardening and tempering furnaces, salt bath furnaces, induction heating equipment, vacuum sintering and brazing furnaces. Fortysix figures.

28. **High temperature melting without contamination in cold crucibles —**

H.F. Sterling and R. W. Warren (Metallurgia, **67**, 301, 1963). The problem of processing of reactive metals at elevated temperatures has been solved in a novel way by a combination of RF heating and cold metal containers, which are themselves part of the work coil inductance. Thirteen figures and 15 references.

29. **Hydrogen peroxide production —**

(Belgian Patent 622, 637, Sept. 1962). The process described is based on alternate catalytic hydrogenation and oxidation of alkylanthraquinone. Degraded alkylanthraquinone solutions are regenerated by treatment with an oxide of several metals, one of which may be lead. The treatment is carried out after the oxidation stage.

30. **Effect of simple surfactants on kinetics of electrode processes —**

H.P. Agarwal (Agra University J. of Research, **12**, pt 1, 79, 1963), The faradaic rectification method has been used for studying the effect of simple surfactants on transfer coefficient and kinetics of ferrous-ferric redox processes.

T.L.R.

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