ABSTRACTS

(A) General

1. **Alkali metal voltaic cells**—

D. C. Hamby, B. W. Steller and J. B. Chase (J. Electrochem. Soc., **111**, 998, 1964). Describes cells of the type alkali metal alloy anode-nonporous membrane (charge transport by alkali metal ions) — molten salt electrolyte — cathode. Cell characteristics and resistivity data on membrane materials are given.

2. **Performance limits of hydrogen-oxygen fuel cell systems**—

A.M. Lord and J. T. Cumming (Electrochem. Tech., **2**, 185, 1964). The temperature and pressure effects of hydrogen-oxygen systems are evaluated, and the data are intended to help system designers minimize heat loads by choice of temperature and pressures of reactants and products.

3. **Plating on precious metals**—

D. G. Foulke (Plating, **51**, 685, 1964). Procedures for plating on gold and platinum metals; 4 tables ane 6 references.

4. **Improved throwing power claimed for new chromium plating solution**—

(Products Finishing, **28**, No. 10, 37, 1964). A proprietory chromium plating process "Duramir 200" will deposit chromium at current densities as low as 6 asf, and at the same time produce clear, bright coatings on the same part up to 600 asf. Details of the operating conditions and other data given.

5. **German standards in electroplating** —

(Galvanotechnik, **55**, 77, 1964).) Plating with duplex coats and alloys, tin, chromium and copper-base coatings; phosphatizing; thickness, roughness and corrosion resistance.

6. **Organic finishing in review** —

H. G. Booker (Plating, **51**, 777, 1964). Review: coating resins and materials, methods of application; includes electrophoretic painting. Twentyone figures and 8 references.

7. **Electrophoretic techniques for depositing ceramic coatings** —

K. Shaw (Industrial Finishing, **16**, No. 193, 43, 1964). An account of the experimental work being done in the USSR in using electrophoresis for depositing ceramic coatings on copper wire and other articles such as tubes and cylinders.

8. **Science for electroplaters 90. Chromium** —

(Metal Finishing, **62**, No. 8, 73; No. 9, 79, 1964). Spray suppression, surface blanketing, surface active agents, barrel plating, current; thickness of deposit, barrel plating solutions, plating barrels, continuous barrel process.

9. **Deposition of metallic coatings by chemical reaction in the vapour phase** —

L. W. Owen (Electroplating and Metal Finishing, **17**, 296, 1964). Introduction, equipment and design, process variables, coating characteristics, hydrogen reduction and thermal decomposition processes, other processes, mechanism of deposition, applications; 19 references.

10. **Plating on semiconductor and electronic devices** —

E. F. Duffek (Plating, **51**, 877, 1964). A summary of some of the requirements and applications of plating on semiconductors and electronic devices is given. Four tables, 19 figures and 23 references.

11. **Recent developments in electrophoretic coatings** —

M. Ortner, (Plating, **51**, 885, 1964). Introduction, general characteristics, mechanics of deposition, applications, Two tables, 10 figures and 20 references.

12. **Inorganic coatings for high-temperature service** —

P. W. Sherwood (Products Finishing, **28**, No. 12, 66, 1964). Coating and coating methods for protecting metals in the 2,000 F range.

13. **Producing coloured coatings on various metals**—

J. A. McCarthy (Metal Finishing, 62, No. 9, 56, 1964). Black nickel plating electrolyte: coatings on steell galvanized steel and zinc-plate, tin-plate and other metals; corrosion resistance. One figure, 8 tables and 5 references.

14. **Bright alloys of indium with zinc or cadmium. Deposition from sulfamic acid baths —**

L. Domnikov (Metal Finishing, 62, No. 9, 73, 1964). Cathode polarization curves, solution composition and plating conditions, internal tensile stresses.

15. **The standardisation of methods of corrosion testing and their application to metallic coatings —**

P. Morisset (Electroplating and Metal Finishing, 17, 343, 1964). Methods of corrosion testing, correlation with atmospheric exposure, standardisation of the application of tests, standardisation of test ratings.

16. **The electrophoretic deposition of aluminium on steel—**

(The Aluminium Courier, No. 66, 22, 1964). An account of the 'Elphal' process of aluminising steel, by electrophoretic deposition of aluminium powder, with subsequent rolling and sintering.

17. **Have you considered electroforming ? —**

F. L. Siegrist (Metal Progress, 86, No, 4, 219, 1964). Advantages of electroforming, applications.

18. **Evaluating the properties of plated finishes–**

S. P. Gary (Products Finishing, 29, No. 1, 36, 1964). Thickness, corrosion resistance and/or porosity, physical properties; 11 references.

19. **Plating for the electronics industry —**

(Products Finishing, 29, No. 1, 74, 1964). Panel discussion report.

20. **Black plating on aluminium —**

B. A. Shenoi and (Miss) K. S. Indira (Metal Finishing J, 10, 385, 1964). An account of the process for obtaining an adherent deposit on aluminium of black nickel, black molybdenum, black chromium etc: surface preparation, baths and operating conditions, and chief applications of the processes; 57 references.

21. **The electroforming of refractory metals —**

G. W. Mellors and S. Senderoff (Plating, 51, 972, 1964). Report on results from molten salt baths for zirconium, hafnium, vanadium, niobium, tantalum, chromium, molybdenum and tungsten. Eleven figures and 6 references.

22. **Plating of lead-tin-antimony ternary alloys -**

D. L. Cox (Plating, 51, 976, 1964). The plating of ternary alloys of lead-tin-antimony from the fluoborate bath has been outlined with reference to composition, operating range and effect of variables.

23. **Practical problems in industrial plating — A panel discussion —**

(Plating 51, 1002, 1964). Topics covered are conversion from cadmium to zinc plating, soldering to gold, tin and tin-lead, sulfamate nickel, ruthenium plating, chromate conversion coatings, electroless nickel.

24. **Studies on the electrolytic reduction of benzoic acid to benzyl alcohol at a rotating lead cathode —**

K. Natarajan et al (Electrochem. Tech., 2, 151, 1964). The use of a rotating lead cathode in the electrochemical reduction of benzoic acid in dilute sulphuric acid gives a good current efficiency. Potential measurements have been made, and the technique successfully tried with a 70-amp cell. Six tables, 7 figures and 12 references.

25. **Nickel and nickel alloys —**

(Materials in Design Engg, 60, No. 1, 97, 1964). Complete guide to nickel and its alloys: available types and forms, important properties, and processing and fabrication characteristics.

26. **Beryllium as a structural material —**

W. Hodge (Battelle Tech. Review, 13, No. 8, 12, 1964). Beryllium's excellent properties are leading to its broadening use. It is helping to solve many space age problems, and is emerging as an important structural material for other applications.

27. **Lead - its place in modern technology —**

M. H. Davies (Metal Industry, 105, 177, 1964). Lead consumption and current uses ; future possibilities.

28. **Aluminium for overhead conductors —**

(The Aluminium Courier, No. 66, 4, 1964).

Introduction, special conductors, other conductors, accessories, aluminium busbars. Two tables and figures.

29. **Electrolytic chlorine and caustic soda industry in Japan. I —**

H. Tsukada and coworkers (J. Electrochem. Soc., Japan, **32**, No. 1, 1, 1964). Review under special features, production techniques, research and technical development; 44 references.

30. **Anodic polarization of sintered silver electrode in alkaline solution: Efficiency of charging —**

P. B. Mathur and R. Gangadharan (Indian J. Tech., **2**, 331, 1964). Polarization data show that silver electrodes can be charged without loss of efficiency at the first oxidation stage up to a charging rate as high as 2.2 amp. hr. but not at the second oxidation stage.

31. **Electrochemical behaviour of manganese: dissolution, deposition, hydrogen evolution —**

T. Hurlen and T. Valand (Electrochimica Acta, **9**, 1077, 1964). Manganese dissolution and deposition and hydrogen evolution at manganese electrodes in aqueous chloride and sulphate solutions have been studied by a slow galvanostatic technique. Tafel lines have been obtained for the steady-state dissolution and deposition. The hydrogen evolution reaction is found to be under diffusion control.

32. **A better method for determining trace metals in nickel solutions —**

R. G. Shafto (Products Finishing, **28**, No. 11 138, 1964). How to use atomic absorption spectrophotometry for fast, accurate, measurement of trace metal concentration — copper, iron, lead and zinc.

33. **The determination of trace elements in electroplating solutions by atomic absorption spectroscopy —**

C. M. Whittington and J. B. Willis (Plating, **51**, 767, 1964). The general principles are discussed, together with the procedure for the rapid analysis of copper and zinc impurities in a Watts type nickel solution. The new method is simple, rapid and accurate, and should be capable of extension to many other analyses in the electroplating industry. Seven tables, 5 figures and 10 references.

34. **ASTM Standards - a guide to industry —**

(Plating, **51**, 788, 1964). Recommended practice for preparation of and electroplating on stainless steel.

35. **Changing patterns in research —**

D. C. Minton (Battelle Tech. Review, **13**, No. 7, 9, 1964). The total expenditures in the U.S.A. for research and development are in an incipient stage of a tapering off process. Industry - financed research will probably continue its current rate of growth while expenditures in government move toward stablization. Also considered are the effects of the tapering off process on industry, research and manpower needs. Five figures and 7 references.

— T. L. R.

(B) Corrosion

1. **The corrosion of uranium, zirconium, and some alloys in alkaline solutions —**

J. S. L. Leach and A. Y. Nehru (J. Electrochem. Soc., **111**, 781, 1964). The corrosion of uranium, zirconium and uranium—zirconium alloy was studied as a function of potential in some alkaline solutions. The interpretation of the data for uranium and the alloy involved assumptions concerning changes in the nature of the protective oxide layer associated with changes in the formation potential. Such differences are not shown on the pH-potential diagram generally accepted for the uranium-water system and a new diagram has been derived. Electron diffraction measurements were employed in an attempt to verify the present interpretation.

2. **The effect of heat-treatment on the corrosion and hydrogen pick up behaviour of a zirconium-tin-niobium alloy in high temperature water and steam —**

D. L. Douglass and H. A. Fisch (J. Electrochem. Soc., **111**, 787, 1964). Heat-treatment was shown to increase the rate of corrosion of Zr-2Sn-2Nb over that of the annealed condition, but the rate of hydrogen pick up as a function of total corrosion was found to be relatively insensitive to heat treatment. The effects of heat treatment have been analysed in terms of changes in: (1) alloy constitution, (2) composition of microconstitituents, and (3) the metal structure and oxide orientation.

3. **Corrosion processes and new developments in the protection of underground structures against corrosion —**

W. Kirsch (Metal-Reinig. Vorbehandl, **13**, 9,