ABSTRACTS

1. **The difference in the reaction mechanism of the positive and negative plate of the nickel-cadmium alkaline battery, and the electrochemical behaviour of electrodeposited cadmium electrode —**

T. Hosono and M. Matsui (J. Electrochem. Soc, Japan, **28**, E170, 1960). Difference in reaction mechanism, electrochemical behaviour, x-ray diffraction study of discharged materials. One table and five figures giving potential data and diffraction patterns.

2. **Pore structure and performance of battery separators —**

G. D. Joglekar and V. K. Batra (ISI Bull, **13**, 117, 1961). Introduction, failure of battery, function of separatior, structure of separator, characteristics, conclusions.

3. **Corrosion problems and their treatment 8 —**

(Corrosion Engineer, **3**, No. 4, i, 1961). Economics, painting and coating, cathodic protection, material replacement.

4. **More insight on stress corrosion —**

(Chem. Engg, **68**, No. 8, 206, 1961). Summary of effects of material composition, stress, environment, temperature and time, together with measures to prevent failure due to stress corrosion.

5. **Corrosion problems associated with the use of aluminium and aluminium products in the building industry —**

G. S. Swinbure (Australian Corrosion Engg. **5**, No. 4, 9, 1961). Introduction, aluminium and its alloys, surface finishes, mechanism of oxidadation of aluminium, behaviour in various atmospheric environments, effects of building operations etc. on surface finishes, conclusion.

6. **The stress-cracking of brass—**

A. R. Bailey (Metallurgical Reviews, **6**, No. 21, 101-142, 1961). Review with 181 references.

7. **Comparative stress-corrosion behaviour of some high-alloy steels—**

P. P. Snowden (J. Iron and Steel Inst, **197**, pt 2, 136, 1961) Behaviour of various materials in chloride and caustic alkali environments

8. **Inhibition of the corrosion of pure aluminium in sodium hydroxide solutions—**

J. Sundararajan and T. L. Rama Char (Comptes Rendus Symposium European sur Les Inhibiteurs De Corrosion, Ferrara, Italy, 1960, Universita Degli Studi Di Ferrara, 531, 1961). The corrosion rates for 99.5 per cent aluminium have been determined in sodium hydroxide solutions. The inhibitor efficiencies have been calculated for the following substances, the efficiency decreasing from 70 to 30 per cent in the order: agar-agar, gum acaciae, gelatin, glue and dextrin. A positive difference effect has been observed, and the dissolution of the metal is electrochemical in character. Polarization studies with dextrin show that the cathodic polarization is negligible, whereas the anodic polarization is appreciable and is significantly increased by the inhibitor. The local cell polarization curves have been reconstructed from impressed current data. The corrosion process appears to be under mixed control with a predominance of the action of dextrin inhibitor on the anodic areas of the metal surface. Eleven figures and 22 references.

9. **Studies on corrosion inhibitors at the Central Electrochemical Research Institute—**

K. S. Rajagopalan (Comptes Rendus Symposium European sur Les Inhibiteurs De Corrosion, Ferrara, Italy, 1960, Universita Degli Studi Di Ferrara, 685, 1961). The behaviour of corrosion inhibitors can be satisfactorily explained if their action is considered in terms of the influence on the areas at which the electrode processes by which corrosion takes place occur. Two tables and eight figures.

10. **Inhibition of the corrosion of aluminium-zinc alloy in acid solutions—**

K. G. Sheth and T. L. Rama Char (J. Sci. and Ind. Res, **20D**, 201, 1961). The corrosion rates and inhibitor efficiencies have been determined for aircraft aluminium-zinc alloy in hydrochloric acid solutions with the following inhibitors: acridine, nicotinic acid, strychnine and quinine hydrochloride. Acridine is the best inhibitor. Two tables showing effect of variables on corrosion rates and inhibitor efficiencies.

11. Corrosion research in India—

(Corrosion Prevention and Control, **8**, No. 5, 40, 1961). Brief digest of current research work, with references, under: aqueous and atmospheric corrosion, inhibition and cathodic protection.

12. Corrosion problems and their treatment. 9.

Corrosion Engineer, **3**, No. 5, iv, 1961). Jetties and piers—causes of corrosion, and anti-corrosion techniques.

13. The influence of some colloids on the corrosion of brass—

J. D. Talati, M. N. Desai and A. M. Trivedi (Werkstoffe u Korrosion, **12**, 277, 1961). The influence of gelatin, pulvis, acacia, dextrin, agar, egg albumen and potato starch on the corrosion of alpha and alpha/beta brass in malic acid and ammonium chloride is investigated. The effects of the additives differ greatly as they are liable either to promote or inhibit the overall attack as well as the dezincking. This behaviour is governed by whether the added substance is cathodically or anodically adsorbed.

14. Cathodic protection expands uses for buried aluminium pipe—

(Aluminium News, **14**, No. 5, 7, 1961). The cathodic protection of buried aluminium is becoming an established practice. The problem has been discussed with respect to the factors involved, anodes expandable and conductivity.

15. Atmospheric corrosion on the south-east coast—

K. S. Rajagopalan, P. L. Annamalai and M. Sundaram (J. Sci. and Ind. Res., **20D**, 226, 1961). Studies on the corrosion patterns of mild steel and zinc along the south-east coast have shown that though the climatic conditions at Mandapam Camp and Madras show considerable similarity, there is little resemblance between the pattern of corrosion at the two places. Four tables, 7 figures and 9 references.

16. Influence of anions and acacia as inhibitors on the corrosion of brass at different pH values—

J. D. Talati, M. N. Desai and A. M. Trivedi. (J. Sci. and Ind. Res. **20D**, 236, 1961). Corrosion of brass 70/30 has been studied in the presence of different anions at different pH values. One table giving effect of anions and of acacia powder on corrosion in solutions containing phosphoric, acetic, citric and malic acids.

17. Use of polarization methods in the determination of the rate of corrosion of aluminium alloys in anaerobic media—

S. Evans and E. L. Koehler (J. Electrochem. Soc., **108**, 509, 1961). Tafel-type cathodic polarization curves were obtained for aluminium alloys corroding in anaerobic acid and food media. The overvoltage—intercept method was found to give corrosion currents equivalent to the measured rates of hydrogen evolution. Anodic polarization curves calculated from cathodic polarization data in the vicinity of the corrosion potential gave Tafel slopes which were identical to the cathodic Tafel slope, within 20 per cent, in each case.

18. Bibliography on electroluminescence and related topics Part II—

H. F. Ivey (J. Electrochem. Soc., **108**, 590, 1961). 587 references classified into the following sections: general references on electroluminescence, general references on effects of electric fields in solids, electro-luminescence in zinc sulphide and in other materials, field effects in excited phosphors, galvano-luminescence, applications of electroluminescence, patents.

19. Some recent advances in anodizing practice and knowledge—

F. C. Porter (Metal Finishing J, **7**, 145, 1961). Nature of the anodic film, material characteristics affecting anodizing, modifications in anodizing solutions, development of brightening processes, plant development, continuous anodizing.

20. Electrolytic polishing of bismuth—

G. A. Hare and H. D. Mallon (Metallurgia, **63**, 208 1961). Description of a technique involving alternate grinding and etching, followed by electrolytic polishing.

21. Nickel-chromium plating to specification requirements—

D. J. Bouckley (Electroplating and Metal Finishing, **14**, 152, 1961). Introduction, jigging, plating of copper, nickel and chromium.

22. **Metal Finishing for the electronics industry—**

J. Dawson (Metal Industry, **98**, 331, 359, 1961). Introduction, problem of staining, alternatives to cadmium, valve components, ease of soldering, service requirements, contacts, precious metal deposits; printed circuitry, electroforming, other applications.

23. **Industry and the outplater—**

E. A. Ollard (Industrial Finishing, **13**, No. 155, 46, 1961. Answers to questions on the subject of the outplater, his role in the finishing industry, and his future development.

24. **Finishing to government specifications—**

B. B. Joffe (Metal Finishing, **59**, No. 5, 48, 1961). Anodic coatings for aluminium and aluminium alloys; cadmium, chromium, nickel, silver and zinc plating (electrodeposited).

25. **Measuring plating thickness. Industrial applications of x-ray methods—**

R. H. Zimmerman (Metal Finishing, **59**, No. 5, 67, 1961). Introduction, preparation of standards, calibration curves, precision, size and shape considerations, applications; 12 references.

26. **Science for electroplaters. 65. Variables in the Watts bath—**

L. Serota (Metal Finishing, **59**, No. 5, 76; No. 6, 94, 1961). Introduction, stress; thickness.

27. **Electroless deposition of nickel-phosphorus alloys from pyrophosphate solutions—**

M. Schwartz (47th Ann. Tech. Proc. Amer. Electroplaters' Soc., 176, 1960). The deposit composition is relatively constant—nickel 95 and phosphorus 5 percent. The use of pyrophosphates as complexing agents permits of substantially lower operating temperatures as well as of increased deposition rates.

28. **An improved method for removing carbonates from cyanide plating solutions—**

C. R. Reinheimer (Products Finishing, **25**, No. 8, 50, 1961). Introduction, disadvantages of traditional methods of carbonate removal, new chemical method, calculations.

29. **Recent developments in wire and strip anodizing of aluminium—**

B. A. Shenoi and P. V. S. Subramanian (Current Engineering Practice, **3**, No. 12, 15, 1961). Recent trends in the production of anodized wire and strip, their applications, and the properties of the insulating oxide films are described.

30. **Alloy plating in metal finishing—**

S. Venkatachalam and T. L. Rama Char (Current Engineering Practice, **3**, No. 12, 18, 1961). The electroplating of alloys — of tin, iron, chrominum, tungsten, molybdenum and miscellaneous, has been discussed with special reference to types of alloys, plating baths and industrial applications. 61 references.

31. **A survey of non-electrolytic chromate treatments and coatings—**

W. T. Lee (Metal Finishing J, **7**, 169, 1961).

32. **Metal finishing technology. A students' guide 8—**

A. Alexander (Metal Finishing J, **7**, 176, 1961). Internal mechanism of an electrolytic cell.

33. **Testing anodized aluminium—**

F. C. Porter (Metal Finishing J, **7**, 181, 1961). A survey with 10 references.

34. **The structure of some electrodeposited tin alloy coatings—**

R. F. Smart, R. M. Angles and D. A. Robins (J. Inst. Metals, **89**, 349, 1961). The structures of alloys of tin with lead, zinc, cadmium and copper over a wide composition range have been studied metallographically and by x-ray diffraction.

35. **pH change in nickel plating—**

R. G. Maling (Electroplating and Metal Finishing, **14**, 191, 1961). The experiments indicate that pH changes far more rapidly in high chloride nickel plating solutions than in the corresponding high sulphate solutions.

36. **A metallurgist's thoughts on electrodeposition—**

J. W. Cuthbertson (Trans. Inst. Met. Finishing, **38**, Part I, 1, 1961). Introduction, structure

and adhesion of electrodeposits, electrodeposition of alloys, structure of electrodeposited alloys; 18 references.

37. **Electrodeposition of nickel-iron-tungsten ternary alloys from the pyrophosphate bath—**

K. I. Vasu and T. L. Rama Char (J. Sci. and Ind. Res., **20D**, 241, 1961). The pyrophosphate bath has been used for the electrodeposition of ternary alloys of nickel, iron and tungsten. The conditions have been established for obtaining satisfactory alloy plates with 14-75 per cent nickel., 10-53 per cent iron and 11-48 per cent tungsten. One table gives effect of different variables on deposit composition, cathode efficiency and potential.

38. **Electroplating chromium directly on aluminium—**

C. L. Faust, G. R. Schaer and D. E. Semones (Plating, **48**, 605, 1961). A chromium plating process is described using direct current of a nature heretofore considered unsuitable for practical plating. The electrodepositing current is related to the chromium hydroxide mechanism of deposition for providing relatively soft chromium of sufficiently low stress for direct deposition on aluminium.

39. **The present status of decorative nickel-chromium coatings: A survey—**

W Blum (Plating, **48**, 613, 1961). Summary, introduction, background, methods of test, correlation, variables in the plating schedules, effects of a copper layer, nickel deposits, chromium deposits, suggestions; 62 references.

40. **Immersion plating of the platinum group metals—**

R W. Johnson (J. Electrochem. Soc, **108**, 632. 1961). Satisfactory immersion plating processes have been developed for the deposition of palladium, rhodium, ruthenium and platinum. Adherent coatings which provide useful wear-resistance in addition to protection against tarnish and corrosion have been deposited on copper and copper alloys.

41. **Barrel plating by means of electroless palladium**

R. N. Rhoda (J. Electrochem. Soc, **108**, 707, 1961). Further refinements in the operating procedure and bath formulations are reported.

42. **Measurement of thickness of electroplates taking advantage of the impedance change in the stripping cell—**

U. H. Narayanan, K. Sundararajan and M. S. Kasabekar (J. Electrochem. Soc. **108**, 710, 1961). The method and the instrument was put to test for chromium plating on copper, and for cadmium coatings on mild steel and copper.

43. **Anodic oxidation of metal ions to insoluble higher oxides with special refrence to manganese dioxide—**

H. K. Chakrabarti, and T. Banerjee (Proc. Nat. Inst. Sci., India. **26-A**, Suppl I, 37, 1960). An attempt has been made to correlate the oxidation process with the anodic double layer containing discharged and charged anions and cations. Six figures on anode efficiency, and 19 references.

44. **Industrial application of radioisotopes and radiation—**

H. R. Batchelder (Battelle Tech. Review, **10**, No. 5, 10, 1961). Low-level radiation sources are widely used in research and for the control of processes. Use of radiation in massive doses as energy for processing, however, is still restricted by economic and technological problems

45. **Semiconductor power rectifier cells—**

(Wiggin Nickel Alloys, No. 61, 5, 1961). An account of the rectifier cells, including design and applications.

46. **Copper and copper alloys. A survey of technical progress during 1960—**

(Metallurgia, **63**, 175, 1961. Electrical proties and applications; mechanical, chemical and marine engineering; corrosion; finishing and plating; joining; powder metallurgy; physical metallurgy and metallography; analysis and testing; building and plumbing; miscellaneous; 175 references.

47. **Electrochemical machining—**

(Electroplating and Metal Finishing **14**, 161, 1961), Report on a new process which is taking the principles of electropolishing into the machine shop: introduction, what it can do, applying principles to practice, current position.

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

(Metallurgia, **63**, 283, 1961). Annual survey of developments.

49. **High temperature induction furnaces—**

P. H Dundas (Research, **14**, 262, 196). The design of laboratory high temperature induction furnaces has been treated from the theoretical and practical aspects. This article is intended to give a new approach to the use of induction heating as an important high temperature tool.

50. **Significance of inorganic chemistry in process metallurgy—**

E. Wainer (Ind. and Eng. Chem., **53**, No. 7, 3A, 1961).

51. **Mechanism of electron transfer and related processes in solution—**

J. Halpern (Quarterly Reviews, **15**, No. 2, 207-236, 1961). Review with 91 references.

52. **The thermodynamics of strong electrolytes: Part I—model of the ideal electrolyte; Part II—Limits of validity of cell lattice; Part III—ionic interaction coefficients, Part IV—interaction of solvated ions—**

M. A. V. Devanathan (J. Sci. and Ind. Res., **20B**, 256, 262. 1961); M. A. V. Devanathan and S Srinivasan (ibid, **20**, 269, 1961); M. A. V. Devanathan (ibid, **20B**, 273, 1961).

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a sufficient time to relieve stress, and (2) Cooling at a slow controlled rate to a temperature below the annealing range so that stresses are not set up in the ware. Cooling may then proceed at a quicker rate, the only limit being that the ware must not be allowed to break under temporary stresses due to temporary differentials. The output from a continuous glass melting furnace is annealed by passage through a continuous annealing oven or lehr the ware being carried on a continuous steel mattress.

With power rates fixed at a reasonably low figure, electric melting of glass could be undertaken with advantage.

Bibliography

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I. Peyches, ibid., **32**, 399 (1948).

I. Horowitz, Glass Industry, **34**, 204 (1953).

P. A. M. Gel, Glass, **32**, 269 (1956).

P. LaBurthe, E. Borel, and G. DePiolene, Amer. Ceram. Soc. Bull., **36**, 18 (1957).

C. A. Otto and L. Ainsworth: 'Electric Furnaces' 152 (1958).
