Abstracts

(A) GENERAL

1 Electrolytic iron from low-grade hematite ore—

P. Krishna, P. S. Kinnerkar and D. L. Roy (Trans. IIM. 23 No. 3, 38, 1970). The fines produced in mining is leached with hydrochloric acid and electrolysed in a two-compartment cell. Optimum conditions for electrolysis given. 7 tables. 8 figs, 6 refs.

2 Oxidation of copper-magnesia composite alloys—

T. H. Rao and K. I. Vasu (Trans. IIM, 23, No. 3, 8, 1970). The oxidation kinetics of copper containing a dispersion of 1 to 5 vol. % MgO in the range 500 to 930°C. At 930°C, oxidation is parabolic with an activation energy of 28 Kcal/moee, while at lower temperatures the oxidation, though essentially parabolic, shows occasional transition to non - parabolic relationships. 2 tables, 6 Figs, 3 plates, 22 refs.

3 Overcoming the corrosion of chromium plate—

H. Silman (Ind. Finishing & Surface Coatings. 22, No. 267, 8, 1970). A review of recent developments in chromium plating with particu'ar emphasis on methods of improving corrosion resistance. Discusses corrosion of nickel, triple nickel process, microporous, microcracked and double layer chromium etc. 6 Figs, 6 refs.

4 Aircraft finishes—

J. B. G. Lewin (Ind. Finishing & Surface coatings, 22 No. 267, 22 1970). Discusses the technology of aircraft finishes and their metallurgical aspects.

5 Corrosion protection of civil aircraft—

J. A. Scott (Ind. Finishing & Surface Coatings. 22. No. 267, 23, 1970). Discusses new corrosion protection systems; the design factors: the pretreatment including a film-forming treatment such as anodizing, cadmium plating and phosphating; and the assembly of the structure.

6 What's new in lead and zinc extraction metallurgy—trends and developments in smelting and refining—(Part I and II)

J. H. Reimers (World Mining, 23, No. 8, 32; No. 9, 44, 1970). The Imperial Smelting Process is discussed and mention is made of developments in increased air prehead temperatures, oxygen enrichment, vacuum dezincing, electrolytic lead refining and electrolytic zinc processes. Flow sheet of the Datteln electrolytic zinc plant of Metallgesellschaft AG in West Germany is included.

7 Fluoborate bath for the plating of iron, cobalt and and nickel—

Y. M. F. Marikar and K. I. Vasu (Chem. Era, 6, 5, 1970). Optimum conditions are mentioned for the plating of iron, cobalt and nickel from buffered fluoborate solutions. The mechanism of deposition is discussed on the basis of the effect of pH, temperature and agitation on cathode potential and efficiency. 2 tables, 10 Figs and 43 refs.

7 The role of the cation exchanger resins in corrosion processes—

I. Labody (Korrozios Figyelo, 10, No. 3, 83, 1970). The cation exchangers particularly the hydrogen-form, are found to promote the corrosion of steel, and this needs consideration in the construction of ion exchange columns. 7 Figs, 20 refs (Hung.)

9 Accelerated laboratory tests and atmospheric exposure tests in the qualification of paints—

F. Angyal (Korrozios Figyelo, 10, No. 3, 88. 1970). The laboratory tests include atmospheric exposure tests and the behaviour of paint films to UV-light, temperature, accelerated wet warm weathering, sunlight, cyclic tests, salt spray, cold storage and the resistivity against frost (Hung.)

10 New corrosion inhibitor for warm hydrochloric acid—

E. Bierling (Korrozios Figyelo, 10. No. 3, 91, 1970). For cleaning and pickling steels the permissible corrosion rate is 40 g m² day and for warm hydrochloric

acid, this is achieved by the use of Nikehib I as inhibitor. (Hung.)

11 Metal finishing developments allied to the automotive industry—

E. J. Layton (Proc. 1970 Annual Metal Finishing Conf. of AIMF, p. 7). Review of metal finishing processes in the automotive industry, such as plated plastic components, high-speed chromium plating of intake valve stems, sealing anodised aluminium, conservation of nickel and alternative coating for bumber bars

12 Advances in corrosion resistance of decorative chromium deposits over nickel and copper undercoats—

W. J. Regan (Proc. 1970 Annual Metal Finishing Conf. of AIMF, p. 15). An account of micro-porous and micro-cracked chromium deposits and their behaviour with copper and nickel undercoats. 7 Figs, 7 refs.

13 Metal finishing of new metals and alloys—

D. R. G. Williams (Proc. 1970 Annual Metal Finishing Conf. of AIMF, p. 25). New metals of the future such as the high-strength steels, titanium alloys, aluminium alloys and beryllium would require special treatment procedures.

14 Precious metal plating—

P. G. L. Vivian (Proc. 1970 Annual Metal Finishing Conf. of AIMF, p. 31). A summary of the need, the techniques and the future of precious metal finishes, and a discussion of their properties and the methods of testing them.

15 Role of biodegradable surfactants in the pollution abatement programmes—

R. Ooms (Proc. 1970 Annual Metal Finishing Conf. of AIMF, p. 41). The technical importance of biodegradable surfactans such as detergents, sulphonates and ethoxylates, as in the pollution abatement programme.

16 Paint in the seventies—

J. C. Towner (Proc. 1970 Annual Metal Finishing Conf. of AIMF, p. 55). Discusseselectrostatic powder guns and fluidised bed, and electropo'ymerization techniques.

17 Contribution of electrocoating to industrial painting techniques—

S. S. Bullock (Proc. 1970 Annual Metal Finishing Conf. of AIMF, p. 61). Electrocoating is shown to be simple. The principles of the process and the importance of metal pretreatment are discussed.

18 An effective rust inhibitor—

(Engineering Times, No. 245, 12, 1971). Based on a special grade of tannic acid, the Chemical Dept. of P. R. B., Belgium, has developed a rust inhibitor called Kelate which penetrates throguh all the stratified rust layers, reacts with the rust and neutralises it, and stabilises the rust by combining with it and transforming into a protective coating which is 100% neutral.

19 Plating and its problems–part 2 and 3—

J. D. Greenwood (Metal Finishing J., **16**. No. 188, 244 ; No. 189, 270, 1970). Continues the review serially published in the Journal : controlled deposits, treatments after plating, stress relieving, etc.

20 Nickel plating from sulphamate solution. Part III to V—

R. A. F. Hammond (Metal Finishing J., **16**, No. 188, 234; No. 189, 276, 1970). Part III of the Series deals with the structure and properties of deposits from conventional solutions ; Part IV, with the Ni-speed process ; and Part V, with the deposition of cobalt and nickel-cobalt alloys. The advantages of sulphamate solutions for decorative protective plating and particularly for electroforming are discu-sed in terms of the high rates of deposition and low internal stress, as well as the brightness of the deposits. 19 tables, 30 figs and 59 refs in the series.

21 Quality control and the anodising process for aluminium finishes—

R. H. Hansen (Metal Finishing J., **16**, No. 189, 292, 1970). Discnsses the problem of color standardization with emphasis on architectural requirements.

22 Hydrogen solubility in electrolytically deposited thin films of palladium—

R. V. Bucur and L. Stoicovici (J. Electroanal. Chem. Interfac. Electrochem. **25**. No. 2, 342, 1970). For a compact Pd black, the H_2-

solubility is 0.564 ; this is less for bright films, but more when deposited on Pt.

23 Oxidation of hydrazine in alkaline solution on Pt and Hg—

J. A. Harrison and Z. A. Khan (J. Electroanal Chem. Interfac. Electrochem. **26**, No. 2, 1, 1970). On Pt, the oxidation of N_2H_4 in alkaline solution is a surface process involving a fast three-electron transfer preceding a one-electron rate-determining step.

24 Hydrogen sorption by Pd in hydrazine electro-oxidation–

N. V. Korovin and B. N. Yanchuk (Electrochim. Acta, **15**, No. 4, 569, 1970), H_2 is an intermediate product of N_2H_4 electro-oxidation, and the amount of H_2 adsorbed by Pd in N_2H_4 oxidation increases with anodic polarizasion.

25 Electrosorption of oxygen from aprotic solvents on noble metal–mercury alloys–

W. Lund and M. E. Peover (J. Electroanal. Chem. Interfac. Electrochem., **25**, No. 1, 19, 1970). Chronocoulometry shows that 0_2 is adsorbed on alloys of Hg with Pt, Au, Ir and Rh from solutions in acetonitrile, dmf and dms. Adsorption depends on alloy composition, electrode potential and 0_2 concentration. Double layer capacity increases with alloy formation.

26 Internal stresses of Pt coatings on titanium–

I. E. Veselovskaya and N. I. Sherstyuk (Zashchita Metal., 6, No. 3, 302, 1970) Platinum Metals Rev., **14**, No. 4. 150, 1970). Optimum conditions for formation of Pt coatings on Ti with minimum interral stresses are described.

27 Anodic behaviour of Pb–Pt bielectrodes in low salinity electrolytes–

H. Helber and E. L. Littauer (Corr. Sci., **10**. No. 6, 411, 1970). A thin film of PbO + PbS formed on Pb–Pt surface aids PbO_2 formation and growth in NaCl solutions. The Pt microelectrode influences the sequence of events leading to the initial passivation prior to PbO_2 formation and subsequently is vital to the nucleation and growth of PbO_2.

28. El ctrochemical Cells (Brit. Pat. 1,199,017, Platinum Metals Rev. **14**, No. 4, 156, 1970). A light weight electrode consists of an expanded layer of a catalytic metal such as Au, Pd, Pt, Ir, Rh, Ru or Os.

29 Chemical platinum plating process—

(U. S. Pat. 3,486,928 ; Platinum Metals Rev., **14**, No. 4, 157, 1970). A bath used for depositing Pt alloys containing Rh, Ir or Ru on an active surface contains an alkaline Pt (IV) hydroxide solution, pH 8, a stabiliser such as ethylamine and the reducing agent, N_2H_4,

30 Thick and thin fused coatings–

J. P. Langan (Metal Finishing, **68**, No. 10, 48, 1970). By the electrodeposition of a solderable coating such as tin–or tin-lead on a basis metal that tarnishes easily (e. g. copper) or is difficult to solder (e. g. Kovar), a mild rosin flux would suffice for soldering. 9 Figs, 4 ref.

31 Chemical coatings for magnesium alloys—

L. F. Spencer (Metal Finishing, **68**, No. 9, 63 and No 10, 52, 1970). Deals with the methods of surface preparation and chemical conversion coatings, anodic treatments and and touch-up tecatments. 5 tables, 4 ref.

32 Coating weight and surface area of round wire—

A Mohrnheim (Metal Finishing, 68, No. 10, 58, 1970). A graphical guide is given for the quantity of the required plate material for a specified coating of a round wire.

33 Unsolved corrosion problems–

W. B. Maass (Metal Finishing, 68, No. 10, 60, 1970). Many case-studies of corrosion and remedial measures along with some guidelines for general approach to corrosion problems.

34 Hard chromium plating from self-regulating baths–

N. V. Parthasaradhy, Subramanian and Mary Jose (Metal Finishing, **68**, No. 10, 67, 1970) Bath compositions and operating conditions are given for bright or satin chromium deposits both for decorative and hard chromium applications. 6 tables, 36 photomicrographs. 23 refs.

35 Separating large thin electroformed parts from mandrels–

J. W Dini and H. R. Johnson (Metal Finishing, **68**, No. 9, 52, 1970). Various separation techniques and their relative merits are discussed.

36 Ultrasonics in metal finishing–

B. A. Shenoi, K. S. Indira and R Subramanian (Metal Finishing, 68, No 9, 56, 1970). Concluding part of a comprehensive review of the ultrasonics in metal finishing, including alloy deposition, ripp'ed depositions and anodizing, 107 refs.

37 Mechanical buffering proves more efficient–

L. C. Loyd (Metal Finishing, 68, No. 9, 61, 1970). A general approach to mechanical buffering to reduce cost and polishing time. Photographs of buffering fixtures are given for cylindrical parts, flats etc.

38 Advanced electrostatic coating technology–

W. A. Beach (Metal Finishing, 68, No. 9, 74, 1970). The advantages of the technique are narrated for the benefit of appliance manufacturers.

39 Chlorine industry economics in 1970—

H. A. Sommers (Chem. Age of India, **21**, No. 11, 1013, 1970). Deals with the statistics of of production of chlorine by mercury cells, diaphragm cells, molten salt electrolysis and HCl electrolysis, 2 tables. 11 figs, 18 refs.

40 Development of the mercury cell – a typical case—

B. Strasser (Chem. Age of India, **21**, No. 11, 1025, 1970). Design and performance features of the Hoechst–Uhde cell.

41 Mercury cells with dimensionally stable metallic anodes for causticchlorine production–

K. S. Reddy (Chem. Age of India, **21**, No. 11, 1028, 1970). The process of coating titanium anodes with a noble metal or its oxide and the use of such anodes in caustic chlorine cells are discussed.

42 Weldable Al: Zn : Mg alloys–

K. G. Kent (Metals and Materials, Met. Rev. 147, 4, No. 135, 1970). A review of weldable Al–Zn–Mg alloys, their heat-treatments and methods of use, welding; and corrosion and stress corrosion aspects. 6 tables, 6 figs, 52 refs.

43 Plating and its problems—

J. D. Greenwood (Metal Finishing J., **16**, No. 190, 306, 1970). part 4 of this series deals with the finishing of hard chromium deposits. 25 figs in the series. (See also Abs. No. 19)

44 New bright nickel process—

(Metal Finishing J., **16**, No. 190, 311, 1970). Details of the Nisol 75, the bright nickel bath developed by the Canning research organization.

45 Electrophoresis as a fabrication technique—

J. A. Andrews (Metal Finishing J., **16**, No. 190, 322, 1970). Deals with the use of electrophoresis as a fabrication technique, whereby a substance (alumina, magnesia) is deposited electrophoretically from a suspension. Examples are fabrication of large ceramic bodies, fabrication of computer memory devices and deposition of solid lubricants.

46 Whey Gecomines is a world leader in copper and cobalt hydrometallurgy—

R. J. M. Wyllie (World Mining, **23**, No. 10, 42, 1970). Details of the electrowinning of copper and cobalt in the Gecomines in Congo. Flow sheets given.

47 Experiments in the field of electrolysis–

R. P. Slischis (Galvanotechnik, **61**, No. 8, 653, 1970) The effect of the changes in the pH of the diffusion layer during the electrodeposition of nickel and cobalt.

48 Survey of fastener technology–

B. P. Zelns and P. M. Rush (Metals Eng. Quart. **10**, No. 3, 1, 1970). Deals with the various aspects of fastener technology, including testing procedures, corrosion and stress corrosion.

49 Beta heat treatment improves titanium fasteners–

R. G. Sherman, E. J. Bukont and V. Benson (Metals Eng. Quart., **10**, No. 3, 5, 1970). Work on Ti-6 Al-4 V forgings has shown short beta processing

increases the impact strength and stress corrosion resistance.

50 Techniques for diagnosis of corrosion failures–

E. H. Phelps and M. E. Komp (Metals Eng. Quart. **10**, No. 3, 24, 1970). A review of the techniques for diagnosis of corrosion failures such as pitting, stress-corrosion cracking, intergranular corrosion, corrosion fatigue, High-temperature corrosion, and analysis of corrosion products. 13 photomicrographs.

51 Protective atmospheres can cut heat treating costs—

D.J.Schwalm(Metals Eng Quart. **10**, No. 3, 40 1970). Discusses the problem of scaling during heat treatment and how a protective atmosphere obviates these.

52 Comparison of sulphidation–oxidation corrosion in laboratory tested and long–time service–exposed Ni–, Co–, and Fe–based alloys—

C. J. Spengler, R. Stickler, F. J. Wall rnh W. McCall (Metals Eng. Quart., **10**, No. 3, 58, 1970). Results are presented on the study of a variety of gas–turbine alloys involving long–time field-service exposure and laboratory tests. 1 table, 2 figs. and 12 refs.

53 Effect of dielectric medium on the performance of EDM process—

A. N. Chakraborty and A. Bhattacharyya (J. Inst. Engrs. (India) **51**, No. 2, Part1, CHI, 1, 1970). The process of electrocracking of hydrocarbons in the dielectric of the electro-discharge machining process aids formation of plasma column which in turn affects metal removal rate. The importance of dielectric selection and use of additives in controlling the performance of EDM process is discussed. 2 tables, 5 figs, 5 refs.

54 Benzotriazole as a corrosion inhibitor for copper—

A Walker (Anti-Corrosin **17**, No. 9. 9, 1970). Benzotriazole is a specific corrosion inhibitor for copper and copper alloys in industry and under atmospheric and immersed conditions. 4 Figs, 92 refs.

55 Metallic coatings for the protection of mild steel from corrosion–

C. Davies and N. J. Hanford (Anti-Corrosion, **17**, No. 9, 17, 1970). This is the Part 4 of the series. Deals with Ni, Cd, Pb, Cu, terne plate, Ag and Au platings. Based on the potential-pH diagrams, the domains of corrosion, immunity and passivity are discussed. 12 Figs, and 34 refs. in the series.

56 Multiple nickel coating systems and their protective value--

R. Brugger (Electreplating and Metal Finishing, **23**, No. 9, 24, 1970). A discussion of corrosive atmospheres, accelerated corrosion tests and resistance of nickel coating – single, triple layer, sandwich, microcracked etc – followed by a consideration of the measurement of corrosion currents and of static and mixed potentials. 2 tables, 5 figs, 21 refs.

57 Determination of impurities in cadmium by spectro-graphy or polarography–

S. R, Rajic and S. V. Markovic (Anal. Chim. Acta, **50**, No. 1, 169, 1970). After separation of Cd by distillation at 630°C, Bi, Pb and other impurities are determined spectrographically and polarographically.

58 Polarographic determination of zinc and alkali in TiO_2–

J. Stabryn (Chem. Prumysl. 20, No. 3, 125, 1970; Zinc Abs. No. 6142). Rapid method, suitable for industrial use.

59 Indication of the metal content of chloride melts with the aid of conductivity measurements–

R. Bertram, P. Lambrecht and D. Wiebe (Metalloberflache, **24**, No. 4, 120, 1970; Zinc Abs. No. 6145). Conductivity measurements were carried out on $BiCl_3$ and $CdCl_2$ melts containing small amounts of Cd, Sn and In. The conductivity was dependent on temp. and the type as well as conc. of the dissolved metal.

60 Direct reduction of zinc oxide in the solid phase–

O. Hladik and K. Schwabe (Electrochim. Acta, **15**, No. 4, 633, 1970; Zinc Abs. No. 6147). The mechanism of reduction of ZnO is of interest in zinc/air battery. By electrochemical and radiochemical techniques, the reduction of ZnO in direct contact with the cathode is found to occur in the solid phase. The advantages of the production of Zn powder by the electrolytic

reduction of ZnO suspended in a neutral salt electrolyte are considered.

61 Evaluation of Ni/Fe and Ni/Zn batteries–

T. W. Blickwedel (U. S. Govt. Res. Develop. Repts, 70, No. 6, AD 852, 691 and AD 840, 290, 1970 : Zinc Abs. Nos. 6148 and 6149). An evaluation of the effects of cell parameters on the output parameters. The capacity of the cells was considerably influenced by variations in electrolyte conc. and additives.

62 Effect of temp. discharge and overcharge on the cycle life of Ni/Cd cells–

P. G. Garratt and S. E. A. Pomroy (RAE Tech. Rept. No. 68051 ; Zinc Abs. No. 6152). Hermetically sealed Ni/Cd cells are subjected to long term charge/discharge cycling simulating orbital conditions for a near-earth scientific satellite. Deep discharges, and high and low temp. reduce the life of the cells.

63 Protection with zinc–

Anon (Eng. Mater. Design, **13**, No. 5, 601–606, 1970 ; Zinc Abs. No. 6163). The protective action of zinc (hot dip galvanized, plated or sprayed) for the steel corrosion under atmospheric and aqueous environments.

64 Cathodic protection of offshore structures–

J. A. Lehmann (J. Metals, **22**, No. 3, 56, 1970 : Zinc Abs. No. 6176). The electrochemical nature of undersea corrosion of steel offshore structures, and their cathodic protection by galvanic anodes and impressed current systems. Conditions are described under which galvanic anodes may be employed, and the electrochemical properties of the anode materials are tabulated. Characteristics are considered of the impressed current system in which Pb-Ag alloy and other anodes may be used.

65 Acid copper plating on complex steel and zinc die casts–

R. J. Glauss and N. C. Adamowicz (Plating, 57, No. 3 236, 1970). The difficulties in acid copper plating of steel parts and zinc alloy die castings of complex shape are examined and remedial measures are described.

66 Comparison of cyanide and cyanidefree zinc plating–

R. Ostrow and R. B. Kessler (Plating, 57 No. 4; 354, 1970.) Electroplating installations and pollution problems. A technical and economic comparison of the zinc cyanide and cyanide-free processes is made in terms of cathode efficiencies. throwing power, plate appearance and operating aud waste disposal costs.

67 Quality cyanide zinc plating–

R. R. Bair (Plating, **57**, No. 4, 349, 1970), Alkaline zinc plating processes, control of cyanide waste effluent, and comparison of of several plating systems.

68 Electrodeposition of zinc from pyrophosphate solutions–

O. Radovici and C. Vass (Rev. Roumaine Chim. **14**, No. 9, 1099, 1969 ; Zinc Abs. No. 6218). Equilibrium potentials of zinc electrodes in pyrophosphate solutions.

69 Electrodeposition of a gold–silver–cadmium alloy–

Z. N. Marakhtanova et al (Protect. Metals, **5**, No. 4, 384, 1969 ; Zinc Abs. No. 6219). Influence of cadmium additions on a Au–Ag alloy electrodeposited from a cyanide electrolyte.

70 Electrochemical testing of protective primers–

Y. B. Volkov (Lakokrasoch. Mater. Ikh Primen (USSR, No. 2, 40, 1969; Zinc Abs.No. 6329). Electrochemical effectiveness curves were determined for anticorrosive primers.

71 Electroplating in an ultrasonic field–

R. Walker and J. F. Clements (Metal Finishing J., **16**, No 184, 100 and 105, 1970). A review of studies on electroplating under an ultrasonic field. Advantages of ultrasonic plating : increased hardness, finer grain size and reduced hydrogen pick–up

72 New device for anodic stripping voltammetry–

M. G. Tamba and N. Vantini (J Electroanal. Chem. Interfac. Electrochem. **25**, No. 2, 235, 1970, Zinc Abs. No. 6361). A pool type electrode with facilities for continuous replacement of

solution. Allows analysis of solutions as dilute as 10^{-8} mol/l.

73 Simultaneous determination of Cu, Cd, Pb and Zn in water by anodic stripping polarography–

I. Sinko and J. Dolezal (J. Electroanal. Chem. Interfac. Electrochem. 25, No. 2, 299, 1970; Zinc Abs No. 6362). In 0.1 M acetate buffer at pH 5.8, the lowest concentrations that could be determined are 10^{-7}M for Cd, Pb, Cu and Zn ions in drinking and natural waters.

74 Determination of Ni, Zn, Co and Mn impurities in Cd by pulse polarography–

E. Temmerman and F. Verbeek (Anal. Chim. Acta 50, No. 3, 505, 1970; Zinc Abs. No. 6374). Using 0.1M LiAc or LiCNS as supporting electrolyte, a 10 g. sample permitted determination of 0.01 ppm Ni, 0.01 ppm Zn, 0.02 ppm Co and 0·03 ppm Mn.

75 Improved cathode systems for high energy primary batteries–

M. M. Nicholson (U. S. Govt. R & D Repts, 70, No. 11, AD 845 244, 1970; Zinc Abs. No. 6382). Influence of electronic conductivity on the performance of high energy battery cathode systems. The utilization efficiency achieved with Y-doped and Cd-treated CdF_2 discharged in a $LiClO_4$/propylene carbonate electrolyte was higher than that for the undoped material.

76 Powdered zinc is key to new battery–

Anon (Metals Week. 41, No. 19, 5, 1970; Zinc Abs No. 6385). An instant-starting zinc fuel battery for use in battery powered cars. Powdered Zn is used as fuel. The zinc fuel battery is efficient, economic and provide the same kind of continuous power as the petrol engine, and useful as a portable source of power for lighting, motor boats, golf carts, lawn movers electric wagons and underwater craft.

77 Weathering tests–

G. Beckers, W. Friehe and B. Meuthen (Stahl Eisen, 90, No. 11, 559, 1970; Zinc Abs. No. 6410). Exposure test results on hot-dip galvanized, zinc electroplated and aluminium hot-dip coated wires in industrial, rural and marine atmospheres.

78 Corrosion of different zinc coatings on steel–

W. Radeker and W. Friene (Stahl Eisen, 90, No. 11, 567, 1970; Zinc Abs. No. 6409). The galvanized coatings included those incorporating Sn, Pb, Al, Ti or Cu; Ti and Cu decrease corrosion.

79 Thickness and structure of galvanized coating—

D. Horstman (Stahl Eisen, 90, No. 11, 571, 1970; Zinc Abs. No. 6419). The effects of temp., roughness of the steel surface and other galvanizing parameters on the thickness and structures of the galvanized coatings.

80 Procedure for effluent treatment in electroplating industry—

E. Kapral (Blech 16 No. 10, 585, 1970; Zinc Abs. No. 6460). Various plating effluents and the procedures and equipment for their treatment.

81 Diamond levelling of metal coatings—

L. A. Khvorostukhin and V. N. Mashkov (Vestn. Mashin. 49, No. 10, 54, 1969: Zinc Abs. No. 6462). The fatigue resistance of Cd, Ag, Ni or Cr plated articles can be increased by cold rolling the surface. This procedure permits local plastic deformation without distorting the base metal. The treatment results in a hardening of the surface coating and reduces its porosity, roughness and waviness.

82 Electrodeposition of a Zn-Co alloy–

N. T. Kydryavtsev et al (Zashch. Metal. 5, No. 5, 577, 1969; Zinc Abs. No. 6467). Operating conditions for the plating of Zn–Co alloys from pyrophosphate baths together with the characteristics of the deposits.

83 Square wave polarographic determination of lead—

E. B. Buchanan, T. D. Schroeder and B. Novosel (Anal. Chem. 42, No. 3, 370, 1970). Trace amounts of lead as pollutant in river water determined down to 2 ppb without preconcentration of the samples.

84 Conductance of molten $PbCl_2$ and its mixtures with KCl–

A. J. Eastseal and I. M. Hodge (J. Phys. Chem. 74, No. 4, 730, 1970). The specific conductance of molten mixtures of $PbCl_2$ and KCl has been measured as functions of temp. and comp., and found to follow quadratic temp. dependence and modified Arrhenius relationships. Comp. dependence is discussed in terms of zero configurational entropy.

85 Phase equilibrium diagrams of CuCl – $MgCl_2$ – $PbCl_2$ system–

D. S. Coleman and R. Pollitt (Trans. Inst. Min. Met. 78, C233, 1969). Attention is drawn to the use of halide systems in extractive metallurgy and to their possible application in batteries.

86 Arc electrolysis of lead silicate melts

T. R. Shelley and J. A. Charles (Trans. Inst. Min. Met. 78, C177, 1969 ; Lead Abs. No. 506). Lead silicate melts were electrolysed between a molten metal electrode and an electric arc struck on the top of the melt. Equivalent weights of lead oxide fumes were produced irrespective of whether the arc electrode served as the anode or cathode. Arc electrolysis may result in new advances in extractive metallurgy.

87 Electrochemistry of galena–dithiocarbamate–oxygen system–

B. Yarar, B. C. Haydon and J. A. Kitchener (Trans. Inst. Min. Met., 78, C181, 1969 ; Lead Abs. No. 507). The presence of oxygen is essential for the flotation of galena with sod. diethyldithiocarbamate collector. Electrochemical measurements show that oxidation of galena surface is a prerequisite for the attachment of the collector.

88 Electrochemistry of galena oxygen xanthate flotation system–

D. Toperi and R. Tolun (Trans. Inst. Min. Met. 78, C191, 1970 : Lead Abs. No. 508). Galena electrode rest potentials of galena were determined at different pH values in oxygenated solutions. The limiting range of potential for the flotation of galena was found to fall in an area on the potential–pH diagram where the co–existence of lead xanthate, xanthate ion and dixanthogen is favoured.

89 Electrodeposition of Pb-Sb alloys–

J. W. Dini and J. R. Helms (J. Electrochem. Soc. 177, No. 7. 269, 1970). Pb–Sb alloy deposits are produced by the use of two fluoborate solutions, one containing peptone and resorcinol in addition to Pb and Sb fluoborates and the other containing beta–naphthol.

90 Tin–lead electrodeposits–

G. W. Cavanaugh and J. P. Langan (Plating, 57, No. 3, 245 and No. 4, 369, 1970). Factors controlling alloy comp., throwing power, and production of solderable deposits.

91 Strengthening of electrodeposited lead alloys–

H. J. Weisner, R. R. Vandervoort et al (Plating, 57, No. 4, 358 for Part I and 362 for Part II, 1970). Improved strength is achieved through the use of specific addition agents and inclusion of dispersoids in the deposit. The properties of electroformed lead and lead alloys containing Sn, $Sn+TiO_2$, $Sn+BaSO_4$ and $BaSO_4$ are determined.

92 Electrodeposition on unusual cathode–

L. P. Bicelli and C. Ramagnani (Electrochim. Metal. 4, No. 2, 140, 1969; Lead Abs. No. 573). Amperostatic study of the electrodeposition of lead on vitreous carbon cathodes using perchlorate bath Analysis of the voltage/time curves at a constant c.d. indicate that the deposition occurs by a two–dimensional nucleation mechanism, with charge transfer as the rate determining step.

93 Recovery of lead and sulphur from galena concentrates, using a ferric sulphate leach–

E. P. Haver, K. Uchida and M. M. Wong (U. S. Bureau Mines Report. R. I. 7360, 1970; Lead Abs. No. 578). A procedure for the recovery of lead and sulphur from galena flotation concentrate in which ferric sulphate is used to convert lead sulphide to sulphate and produce elemental sulphur. The ferric sulphate is regenerated by electrolysis, and the leach residue treated with amm. carbonate and the lead carbonate dissolved in hydrofluosilicic acid is electrolysed to recover the lead.

94 Polarographic determination of 0.001 ppm Ag in lead–

N. A. Kolpakova et al (Z. Anal. Khim. 23, No. 5, 665, 1968; Lead Abs. No. 601). Electrochemical concentration of Ag on a graphite electrode.

95 Batteries, secondary. Portable lead-acid and alkaline types–

(Defence Standard (U. K.) DEF. 61-9, Part 2, Issue 1, May 1970; Lead Abs No. 609). Batteries for use by the Navy, Army and Air Force Departments are listed. Data relating to voltage, capacity and overall dimensions are tabulated, as also the interchangeability criteria for lead-acid type secondary storage batteries.

96 Electrothermal equation for Anode connector components–

I. Geld and A. Ticker (Mater. Protect. 9, No. 4, 34, 1970; Lead Abs. No. 622). An electrothermal eq. has been derived to allow selection of optimum design for impressed current anode connecting rods and surrounding components used in cathodic protection systems for ships' hulls.

97 Anodic behaviour of Pb–Ag alloys in sulphuric acid—

O. Hyvarinen and M. H. Tikkanen (Acta Polytech. Scand Chem. Met. Ser., No. 89, 1969; Lead Abs. No. 625). Pb-Ag alloys are excellent anodes in electrolytic zinc plants. The alloy behaviour in sulphuric acid is studied by anodizing potentiostatically within the oxygen evolution region. The first anodic product is $PbSO_4$, then tetragonal PbO and finally beta lead dioxide and increase its stability, a feature of great importance in the electrolysis of zinc.

98 Electroless deposition of metal oxides (alpha PbO_2)–

W. Mindt (J. Electrochem. Soc. 117, No. 5, 615, 1970). Electroless deposition of PbO_2 by oxidation of lead acetate with peroxydisulphate. The variation of mixed potential and growth rate with the pH of the electrolyte was also reported.

99 Oscillopolarographic determination of Cu and Pb –

G. Spini et al (Ann. Chim. 59, No. 1, 30, 1969; Lead Abs. No. 675). Complexes of Pb (II) and Cu (II) with ferron and oxine-sulphonic acids, and the potential and current peaks used for their determination.

100 PbO_2 in the lead-acid cell—

E. J. Ritchie and J. Burbank (J. Electrochem. Soc. 117, No. 4, 299, 1970). Part 2 deals with cycling and overcharge on lead grids.

101 Morphology of Pb and PbO_2 electrodes—

G. Sterr (Electrochim. Acta 15, No. 7, 1221, 1970; Lead Abs. No. 683). Morphology of grid plate surface as a function of acid temperature.

–K. I. V.

(B) THEORETICAL ELECTROCHEMISTRY:

1 Influence of mass transport on electrocrystallization—

N. Ibl (Trans. SAEST, 5, No. 3, 89, 1970). The role of mass transport in electrocrystallization under the conditions of cation discharge alone and of the codeposition of an addition agent is discussed. 8 Figs, 24 refs.

2 Effect of cadminm plating on hydrogen extraction from plated steel—

A. T. Vagramyan et al (Trans. SAEST, 5, No. 3, 98, 1970). Studies on postplating heat treatment of cadmium plated steel in cyanide baths. Heating of the specimens plated with a crystalline coating without brightener leads to a decreased hydrogen content in steel, while those with brightener increases the hydrogen content and worsens its plastic properties. 4 Figs.

3 Metal dissolution and deposition at strained electrodes—

M. A. V. Devanathan and M.J. Fernando (Trans. SAET, 5, No. 3, 101, 1970). Experimental technique to identify the correct model of surface diffusion control during anodic dissolution and cathodic deposition on strained copper. The condition for the transition from the surface diffusion control to charge transfer control with solid electrodes is examined. 1 table, 15 figs, 26 refs.