NEWS SECTION

SOCIETY REPORT

Meetings:

The first technical meeting of the Electrochemical Society of India was held in Bombay on 27 February 1964 at 4 p.m. in the committee room of the Indian Standards Institution, when Mr. P. S. Clark, Director, M/S Canning Mitra Phoenix Ltd., gave a talk on 'Duplex Nickel and Crack-free Chromium'. Mr. P. N. Gandhi, Director, The Nickel Information Bureau (P) Ltd., was proposed as the Chairman of the meeting.

Introducing the subject, Mr. Clark said that while exploring means to increase the corrosion resistance of nickel-chromium plated components, scientists landed on Duplex Nickel type of plating consisting of 70% semi-bright nickel coating and 30% bright nickel coating. In the case of dull nickel plating, the contours of the metal got exaggerated. To counteract the effect of such a build-up polishing was adopted to smoothen out the surface. During the course of polishing considerable amount of nickel was removed. To overcome this defect bright nickel plating was used which smoothened out contours in addition to the levelling of the surface. Apart from the labour hours saved on polishing after nickel plating, the corrosion resistance was improved due to non-removal of nickel by polishing. With Duplex Nickel, consisting of bright nickel over semi-bright nickel, it was essential that the electrode potential of the two deposits should be dissimilar — anodic and cathodic. For this reason dull nickel could be used, as the electrode potential of the layer was not so noble as semi-bright nickel with respect to the basis metal. Further, the semi-bright nickel had a columnar structure while bright nickel had a laminated structure. Thus the commercial Duplex Nickel put out in the market had a composite deposit consisting of 70% semi-bright nickel and 30% bright nickel.

Investigations on Duplex Nickel were extended to the Duplex Chromium. Firstly, increate in chromium thickness was tried to improve corrosion resistance. Unfortunately, thick chromium deposit was found to be highly stressed. To produce stress-free chromium, varying working conditions were investigated to produce a chromium of about 0.00003 in. thickness. The variation in working conditions like current density and addition of a catalyst, improved the efficiency of the chromium bath from 10 to 17%. With the Duplex Nickel and the stress free chromium a number of combinations were tried and the increase in chromium thickness alone did not bring about the desired result of maximum corrosion resistance. The minimum thickness of chromium which could be deposited over nickel to give an effective protection from corrosion was 0.00003 in. crack-free deposit. There were commercial solutions which can be used both for crack-free and bright chromium deposit with change in operational conditions like temperature, current density etc. Touching upon Duplex Chromium Mr. Clark said that Duplex Chromium consisting of 0.00002 in. macrocrack chromium plating over 0.00001 in. crack-free chromium over nickel was generally practised, and it gave good protection as both the layers were equally noble and as there was no potential difference. It is not advisable to use macrocrack chromium over ordinary bright chromium, as there would be severe corrosion due to the small cathodic area and the large anodic area.

In passing, Mr. Clark touched upon Satin Nickel wherein non-conducting materials were included to give a macrocrack effect. He said that this process was still under development. Speaking about the sandwich chromium he said it consisted of chromium over steel with flash nickel — nickel deposit from a Wood type of bath — bright nickel and finally a crack-free chromium. He said that in such a type of sandwich deposit, corrosion stopped at the chromium layer leaving the nickel and flash nickel layers to protect the basis steel .Concluding his speech, Mr. Clark said that there had been considerable research work with regard to increasing the corrosion resistance of nickel coating on steel and the processes like, Duplex Nickel and Duplex Chromium were the results of such experiments. He said that it was learnt that early experiments with regard to Duplex Nickel and Duplex Chromium were carried out in U.S.A. by the Chrysler Corporation, and encouraged by the results obtained

they had adopted the process on some of their components in the automobile industry. He hoped that in India Duplex Nickel could be introduced to increase the protection of nickel deposit.

A film entitled 'Design for Plating' was exhibited for the benefit of those who were present. After an interesting discussion the meeting terminated with a vote of thanks proposed by the Secretary.

GENERAL NOTES

International Standards for Surface Coatings

The International Standards Organization has established a Technical Committee on Standards for Surface Coatings. It would be responsible for (1) The standardization of the characteristics of protective and decorative metallic and non-metallic (excluding paints and other organic coatings) coatings applied by electrolysis, fusion, vacuum or chemical means. (2) The standardization of testing and inspection methods for such coatings. The following working groups have been constituted: terminology, methods of inspection etc., electrodeposited coatings, hot-dip coatings. A brief report of the activities of the Technical Committee has been published in the Metal Finishing Journal, January 1964.

Water Costs in the Plating Shop

One of the least efficient operations in the plating shop is rinsing and frequently more money is spent and wasted on water than on any other material without the management being aware of it. For water has not only to be paid for to get it into the shop, but frequently has to be paid for before it can be allowed to leave the shop as effluent. The main causes of waste are inefficient use of water, excessive drag-out from process tanks, and use of rinse water as an effluent treatment The three chief methods of reducing the cost of water consumption are the use of efficient rinsing systems, control of rinse water and choice of suitable effluent treatment system. — Electroplating and Metal Finishing Vol. 17, No. 1, 1964.

Commonwealth Corrosion Symposium

The Research and Development Organization of the Ministry of Defence, Government of India, held a Commonwealth Corrosion Symposium at New Delhi and Kanpur during January 20-26, 1964. Thirty papers were presented at the technical sessions in Kanpur under the following sections: (1) Aircraft Protection, (2) Environmental Studies, (3) Nonferrous Metals, (4) Inhibitors, (5) Cathodic Protection and Underground Corrosion, (6) Research Methods and (7) Special Environment. Scientists from U.K., India, Australia and Canada participated in the Symposium. The programme was rounded off with visits to scientific institutions and cultural centres. Preprints of the papers were made available prior to the meetings.

CECRI, Karaikudi

The Decennary Celebrations of the Central Electrochemical Research Institute, Karaikudi were held on January 22, 1964, at the Institute. The programme included a Seminar on 'The Role of Electrochemical Industries in the Economic Development of India'. The Seminar papers have been published in the April, 1964 issue of 'Chemical Age of India'.

Pump Corrosion

The January 1964 issue of Materials Protection has published the following 3 papers on pump corrosion problems: (1) Pump Corrosion Problems, (2) Corrosion is the Culprit behind most Pump Shaft Failures and (3) Selective Corrosion on Turbine Water Pumps.

Paints to Withstand High Temperature Corrosion

The need for high temperature enamels to provide corrosion protection of materials from delicate electrical components to bulky boilers and engine exhaust systems has resulted in the development of a paint that operates effectively in temperatures from freezing to 1,200 F. This enamel is claimed to withstand temperatures in this region for short periods and is unaffected by salt spray, humidity and thermal shock. For optimum results it is recommended that the enamel be thinned and applied evenly by spraying or dipping. Sandblasting is the recommended surface cleaner. After application it should be cured for 15 minutes at 250 F, followed by 30 minutes at 600 F. To withstand thermal shock the curing time should be one hour under continually rising heat from room temperature to 850 F. The manufacturer claims that the product can be used for less than one-third the cost of chrome plating, aluminizing or porcelainizing, and is available in 7 colours. — Materials Protection, Vol. 3, No. 1, 73, 1964.

Zinc Plating Solutions Without Cyanide

A non-cyanide barrel zinc plating process called "Pyrozinc B" has been introduced by

Hanson-Van Winkle-Munning Co., Matawan, N.J., U.S.A. Cyanide elimination should mean a reduction in effluent treatment costs. The plating solution — a pyrophosphate composition, is supplied as a liquid concentrate; 2 brighteners as liquids are also used. It is reported to exhibit very good throwing power, high cathode curernt efficiency, and produce deposits of good lustre and colour.—Metal Industry, Vol. 104, No. 2, 46, 1964.

Mechanisms of Electrodeposition

A Symposium on 'The Mechanisms of Electrodeposition', sponsored jointly by the Electrodeposition and Theoretical Electrochemistry Divisions of the Electrochemical Society, New York, will be held at Washington, D.C. during October 1964. Papers are expected to cover all aspects of the subject including electrochemical kinetics, growth mechanisms, structure and properties of the deposits, and the effect of addition agents.

Aluminium Coatings

Alloyd Electronics Corporation, U.S.A., has developed aluminium coatings for copper and other materials by vapour phase decomposition of a low-boiling organo-aluminium compound. Coatings from 5 microinches to 2 mils have been applied at 300 F. Anodizing gives a layer of high dielectric strength with electrical and electronic applications .Miniaturized coils can be made without bulky dielectric interwindings; tubing and other shapes can be coated to exhibit properties of aluminium on one side and copper on the other.—Ind. and Eng. Chem., Vol. 56, No. 1, 7, 1964.

Rayon Grade Caustic Soda Plant at Mettur

The foundation for the 60 tons rayon grade caustic soda plant of Mettur Chemical and Industrial Corporation Ltd., was laid in February 1964, near Mettur Dam R.S. The expansion scheme includes facilities for producing various organic chlorine compounds such as methyl chloride, methylene dichloride, chloroform, pentachlorophenol and carbon tetrachloride.

Stainless Copper

The International Copper Research Association is sponsoring research on the copper industry's most ambitious and imaginative project — a stainless copper alloy for use in architecture and other fields. The aim is to produce an alloy that will spontaneously form its own protective oxide film against tarnishing. It is possible to realize the technologists' dream but this will require a sustained level of effort on a scale unprecedented in the industry.—Corrosion Prevention and Control, Vol. 10, No. 8, 18, 1963.

Corrosion Case Histories

Beginning with the February 1964 issue, Corrosion Technology is publishing each month the case history of an interesting, unusual or particularly difficult corrosion problem actually encountered in some branch of industry. This includes an analysis of the causes of the corrosion and the methods employed to cure the trouble.

Tin-Nickel from Fluoborate Bath

Harstan Chemical Corporation, U.S.A., has developed a new tin-nickel plating bath from fluoborates. Designed to deposit an intermetallic compound containing 65 per cent tin, the bath is said to offer important advantages over previous solutions. It is of interest in the plating of printed circuits, electronic components, marine hardware, automobile accessories, chemical equipment and costume jewelry. —Plating, Vol. 51, 146, 1964.

Meetings of the ECS of Japan

The 30th meeting of the Electrochemical Society of Japan was held in Tokyo during April 1963. Hundred papers were presented under the following sections: corrosion and anti-corrosion, batteries, extractive metallurgy, theoretical electrochemistry and industrial physical chemistry, electro-deposition and surface treatment, high temperature chemistry and fused salts, industrial electrolysis, organic electrochemistry, electroanalysis and electronics and materials for electrical industry. Titles of the papers are given in JECS of Japan, Vol. 31, No. 1-2, 1963.

Corrosion Conference in Japan

The 10th Corrosion Conference was held at Takarazuka, Hyogo, Japan, during October, 1963, under the joint auspices of 15 organizations including the ECS of Japan. Fifty-seven papers were contributed covering various aspects: stress corrosion, corrosion in the industry, passivity, inhibition, cathodic protection, protective coatings, miscellaneous. The JECS of Japan, Vol. 31, No. 1-2, 1963, has published the list of all the papers.

Iron-Zinc Alloy Coatings

Electrolytic coatings of iron-zinc alloy have up to twice the life of electrodeposited zinc coating of the same thickness, according to

the British Iron and Steel Research Association. They are claimed to be particularly suitable for the continuous coating of steel strip that is to be roller-formed into sections or other shaped articles. In addition to corrosion resistance, other advantages of the alloys are said to be: good adhesion to steel, hardness at low zinc content, and a suitable base for other electro-finishes. They are applied electrolytically from sulphate solutions.—Chemical Engg. Vol. 71, No. 5, 27, 1964.

Protective Coatings

The March 1964 issue of 'Materials Protection' contains several articles on different aspects of protective coatings: choice of the right coating, organic and inorganic primers,airless spray coatings, organo-silicone coatings, hot dip galvanizing, permanent primers for steel — self-curing and post-curing inorganic zinc coatings, organotin based antifouling coatings.

Cadmium-titanium coatings

A Japanese Company has developed an electrodeposited anti-corrosive cadmium-titanium alloy coating containing 0.1-0.5 per cent tatanium. It adheres well and is said to be much more resistant to corrosion than the conventional electroplated cadmium. The process employs a cadmium cyanide electrolyte containing a titanium compound, using cadmium anodes.—Zinc Abstracts, Vol. 22, No. 2, Abs. 4621, p. 60, 1964.

Nickel-Cadmium Batteries

The Proceedings of the 17th Annual Power Sources Conference, 1963 (PSC Publications Committee, Red Bank, N.J., U.S.A) containing the following papers on nickel-cadmium batteries: (1) Sealed nickel-cadmium batteries, (2) Evaluation of secondary batteries, (3) Optimum charge procedures for sealed nickel-cadmium batteries, (4) State-of-charge methods for nickel-cadmium batteries. Abstracts of the papers can be found in the Nickel Bulletin, Vol. 37, No. 1-2, 1964.

20th NACE Conference

The National Association of Corrosion Engineers held its twentieth annual conference in Chicago during March 1964. A large number of papers were presented under the following sessions: aerospace metals, cathodic protection, chemical industries, cooling water, corrosion principles, elevated temperatures, general corrosion, general pipeline, high purity water, inhibitors, marine, oil and gas production, plastics, protective coatings, refining industries, utilities, miscellaeous. The programme included a corrosion show. Titles of the papers have been published in the January 1964 issue of Materials Protection.

—T.L.R.