

v. 1, 85, 6, 7, 9, 12

LEAD INDUSTRIES ASSOCIATION, INC.

292 MADISON AVENUE

NEW YORK 17, N. Y.

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SUBJECT: LEAD ABSTRACTS

To Members of the Lead Industries Association, Inc.:

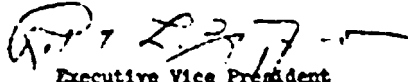
Enclosed is the first issue of "Lead Abstracts" prepared and distributed under joint financial arrangements reached last year between the Lead Industries Association, Inc., American Zinc Institute, Inc., Expanded Research Program of AZI and LIA, the Lead Development Association of London and the Zinc Development Association of London, as explained on the inside front cover and in the introduction.

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LEAD ABSTRACTS

Lead Abstracts and its companion publication, Zinc Abstracts, are now prepared in the new ZDA/LDA Joint Library. Between them, the two publications review all current world literature on the uses of the metals and their products, and all published research work. The Library maintains full indexes for easy reference to past and present literature, most of which is available in the Library and can be borrowed by enquirers living in the United Kingdom. Foreign enquirers can be supplied with photostat copies at cost price in so far as the Copyright Act allows. Readers in the United States who are not able to borrow material from the Library can order photostats through the American Zinc Institute or the Lead Industries Association. Translations of the more important articles published in foreign languages are available on request. All requests for loans, photocopies, or translations should quote the individual abstract numbers of the items needed.

The Library, which exists for the service of zinc and lead users throughout the world, is jointly financed by the Zinc Development Association and the Lead Development Association of London as well as by the American Zinc Institute, the Lead Industries Association and the AZI/LIA Expanded Research Program. These American organisations, whose offices are at 292 Madison Avenue, New York 17, will maintain duplicate card indexes of current material coming into the Library in London, and all enquiries from the American continent should be addressed to them in the first instance.

Classification. Alongside each abstract a list of index headings (uniterms) is given. Each uniterm corresponds to one concept and when they are combined, the abstract is completely indexed. The uniterms are deliberately numerous to save time in literature searching while keeping the punched card index compact. References can still be traced even when only some of the terms are quoted. A more detailed account of the index and its use is available to librarians wishing to adopt a similar system.

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Abstracts: 761 - 804

This is the first issue of the Lead Abstracts in a new form, and from now on they will appear monthly instead of quarterly. The merging of the libraries of the LDA and ZDA, and the support of their American counterparts, the LIA and AZI, has enabled a wider field to be covered, and a more comprehensive classification scheme will allow information in the form of first-hand references to be found without delay.

In this issue mention is made of a new book on Lead Cable Sheaths (761), and the recent advances in the tubular lead-acid battery (762) are reflected in the patent literature (763, 765). The effect of modern detergents on plumbing systems is mentioned, and it is shown that the active constituent is capable of dissolving tin from a solder joint (768). An account is given of a lead-telluride thermocouple system developing 5 W (763), but other developments having larger potential markets are the addition of aliphatic acids to petrols (760) and the use of lead to line domestic flue pipes (766). The former invention shows how the introduction of these acids to petrols containing lead organics may raise their octane numbers still further at a negligible cost and, consequently, the amount of lead in those petrols which now contain little, or even none, should be increased. Lead-lined flexible ducts for flue pipes subject to corrosion are likely to be required in increasing quantities as smokeless zones spread and more domestic heating is converted to oil or gas, a change which will tend to promote internal corrosion of unprotected chimneys.

Introduction

Electrical Cable Sheathing

Lead
Alloy
Cables
Sheathing
Extrusion
Faults

761 Lead and lead alloy cable sheaths

S. A. Hiscock. Book published by Ernest Benn Ltd, London, 1967. Num. illus. 361 pp.

Despite competition from other materials, lead remains the most important material for electric cable sheathing. Its production, properties and applications are described and references to original materials are included. Lead alloys used, manufacturing equipment and modern processes are covered. Extrusion defects, their causes and elimination are discussed.

Batteries

Lead
Acid
Batteries
Antimony
Anisaldehyde
Cadmium
Sulphate
Anisic
Anisic alcohol

732 Patent 879,970 Improvements in lead-acid batteries

Electric Storage Battery Co. Oct. 11th, 1961.

The invention relates to an electrolyte for reducing self discharge of the negative electrode, i.e. local action, in lead/acid storage batteries with lead-antimony alloy grids. The electrolyte consists of a dilute solution of sulphuric acid containing an aromatic aldehyde, or one of its oxidation and reduction products, in an amount of 1-10g/l. Anisaldehyde, anisic alcohol and anisic acid are suitable addition compounds. Cadmium sulphate may be incorporated in the electrolyte in an amount of 1-10 g/l; an aromatic aldehyde/cadmium sulphate mixture is said to be the most effective electrolyte additive for reducing local action.

763 Patent 879,300 Improvements relating to the positive plates of lead-acid type electric accumulators

C. J. Bushrod. Oct. 11th, 1967.

This patent refers in general to tubular-type plates and lays a claim to one woven out of polyethylene terephthalate (e.g. 'Terylene'), impregnated with an organopolysiloxane, in particular the phenyl-methyl resin. It is claimed that the use of 'Terylene' protected from oxidation by silicone resin results in superior plate.

Lead, Acid
Batteries
Tubes and pipes
Plates and sheets
Phenyl, Methyl
Resin, Terylene

764 Patent 879,500 Improvements in or relating to an electric cell

Yardney International Corp. Oct. 11th, 1967.

Details are given of an electric cell, fitted with an ion permeable metal control grid, designed to reduce the likelihood of growths of active electrode material extending across the space between the electrodes and causing a short circuit. The negative electrode used with an acidic electrolyte contains lead and that used with an alkaline electrolyte contains zinc.

Lead, Acid
Batteries, Grid
Control, Ions
Permeable
Short circuit
Protection

765 Patents 881,402 & 881,403 Electric accumulator battery

P. J. Moll. Nov. 1st, 1967.

Improvements in the fitting and ventilating systems for acid batteries are claimed in these patents.

Lead, Acid
Batteries, Fitting
Ventilating

758 Patent 809,717 Improvements in and relating to the production of fabrics

Courtaulds Ltd. Oct. 25th, 1961.

A process is claimed for the production of a fabric suitable for the manufacture of lead accumulator plates used in tubular accumulators. A monofilament polyethylene yarn having a denier of at least 150 is woven into a double plain fabric in which the plain weave fabrics interlace at regular intervals across the warp to form a series of tubes disposed side by side. The tubes are then heated on a series of rods fitted inside the tubes to a temperature below the melting point of polyethylene but sufficient to relax and to set the yarn.

Poly-
Ethylene,
Lead
Plates and sheets
Batteries
Tubes and pipes

767 Radiation screening panels

Anon. Nuclear Engng. Nov. 1961. 8 (66), 482. 1 Fig. 180 Words.

The panels are designed for use in X-ray and low energy gamma work, where radiation levels are not high enough to require a wall of lead bricks. They consist of the necessary thickness of lead bonded to chipboard or other material. Radiation leakage at the joints is prevented by lead strips, bushings and plugs let into the panels and into the framework. The panels have undergone severe climatic tests. Paint or enamel may be applied after assembly.

Rolled and
Extruded Lead
Radiation
Shielding
Lead, Rolled
Strip, X Rays
Leakage
Protection
Gamma
Rays

768 Corrosion of soft solder by detergents

Anon. Engng. Materials and Design. Nov. 1961. 4 (11), 740. 2 illus. 430 Words.

Corrosion by derivatives of sulphonic acid in concentration even below 2% may cause total failure of a joint. Tin is selectively dissolved. The problem is most troublesome in sewers but a change-over to non-ionic detergents may in time reduce the dangers.

Alloys

Corrosion
Soft Solder
Detergents
Sulphonic
Acid, Tin

769 Patent 809,402 Method of producing nuclear fuel in the form of grains

Wissenschaftlich-technisches Büro für Reaktorbau. Oct. 25th, 1961.

Atomic hydrogen is used to reduce the fuel metal oxide particles on the surface of the carrier metal melt to ensure wetting of the fuel particles by the melt. The carrier metal melt may consist of lead or bismuth, or of a eutectic lead-bismuth alloy, or of one of these metals alloyed with tin, lithium, sodium, and/or potassium.

Atomic, Hydrogen
Reduction, Metal
Oxide, Nuclear
Fuel, Manufacture
Carriers, Lead
Bismuth, Tin
Lithium, Sodium
Potassium

770 Diesel engine bearings

D. G. Christopherson. Engng. Digest (Canada). Oct. 1961. 7 (10), 41-3. 2 Figs. 2 illus. 1300 Words.

The article, which has been delivered as a paper to the Institute of Diesel Engineers of Australia, described the work on distribution of lubricant films done at Glacier Co. Ltd., Middlessex, with a device called Ramrod.

Lubrication
Films
Tests

Lead
Alloy
Structure
Ions
Radius
Metalloid
Transition
Metal
Zinc
Cadmium
Electron
Compounds
Hume-Rothery rule

771 Über ternäre Verbindungen von Übergangsmetall, B-Metall und Metalloid

(Ternary compounds of transition metals, B-metals and metalloids)
H. H. Stadelmaier. *Z. Metallkunde (Germany)*. Nov. 1961. 52 (11), 758-62. 10 Figs. 2600 Words (in German).

A review is given of the ternary phases of transition metals, B-sub group metals and metalloids, and their stability is discussed. Alloys of zinc, cadmium and lead are considered. The lattice geometry is governed by the ratio of the radii of the metalloid to those of the transition metal. Hägg's rule is valid for perovskite type structures with an upper limit slightly over 0.58. The perovskite rule formulated for ionic compounds is not applicable. When the limit of 0.65 is exceeded by the ratio of the radii, antiprismatic co-ordination of the borides is obtained. On treating the phases as electron compounds, it is concluded that the metalloids tend to prevent electron transfer in the transition metals and that the addition of the B-metals follows the Hume-Rothery rule.

Lead Pigments and Fillers

Primers, Sulphate
Vehicles (Paint)
Red, White
Lead
Uses
Steel
Industrial
Atmosphere

772 On choosing the right primer

Anon. *Propeller*. Published by the 'International' World-Wide Paint Organisation. (11), 1-4. 1961. 2 illus. 2 Figs.

The pamphlet is primarily concerned with the selection of primers for use on steel above water. Separate sections deal with corrosion inhibiting pigments: zinc chromate, surface preparation and primer media. Zinc chromate and red lead pigments inhibit corrosion independently of the type of paint medium used. Paints based on red lead are recommended for use in industrial atmospheres; lead sulphate formed on the surface of the coating is an excellent corrosion inhibiting pigment. Mention is made of white lead pigment.

Lead
Dust
Pigment
Poly-
urethane
Pre-
Treatment

773 Anti-corrosive coating cures under adverse conditions

Anon. *Production Equipment Digest*. Nov. 1961. 8 (11), 48. 250 Words
Details are given of Adcora Pervon, a polyurethane pitch coating for metallic surfaces, which cures rapidly at all temperatures, including those below 0°C. The coating is said to be highly resistant to chemicals and to be unaffected by high humidity during the curing period. For continuous immersion service, blast cleaning and a dry film thickness of 10-15 mil are specified; pre-treatment of the surface with Adcora Pervon Primer, a metallic lead pigmented polyurethane based product, is recommended for all other applications.

774 Patent 836,346 An improved paint or protective composition

P. Freitag. Oct. 18th, 1961.

The composition contains a butyl rubber binder and is supplied in the form of two separate liquids, one containing a vulcanizer and the other an accelerator, which are mixed immediately before

Lead
Per-, Oxide
Butyl

application. The binder is a solution of a co-polymer of a monoisoprene and a diolefin in a solvent of a boiling point between 140°C and 200°C. The solution may contain one or more synthetic resins. Non-setting red lead powder is a suitable pigment and the vulcanizing agents used include lead peroxide and activated zinc oxide.

Rubber
Vehicles (paint)
Non-setting
Red

775 Lead suspension for low energy radiation shielding

E. A. Watts. Health Phys. Oct. 1960. pp. 68-9. 1 Table. 600 Words.
A lead suspension has been developed using Plicote Laboratory Paint and 'finest powder' grade metallic lead to improve equipment shielding. The paint adheres well to brass and steel, and no priming is required. When sanded, no binder is visible and the surface may be finished with enamel. To avoid difficulties due to non-uniformity, a 25% margin is recommended. 113.4 g of lead on 1,000 sq cm will provide a film thickness of 0.1 mm.

Lead
Pigments
Radiation
Shielding
Dust
Uses

776 Solar reflectivity of paints

R. N. C. Strain. J. Oil Col. Chem. Assoc. Oct. 1961. 44 (10), 688-712. 18 Figs. 7 Tables. 5200 Words.

The author describes and discusses the investigations carried out on a number of coating systems and surfaces, including galvanized steel, zinc sulphide and oxide, basic white lead and basic lead carbonates. The theoretical principles involved are considered. Basic white lead in a non-absorbing acrylic medium has solar reflectivity of 80-8% and is superior to rutile or anatase titanium dioxide in a non-absorbing medium. A top coat of basic white lead in nitrocellulose can increase the reflective efficiency of a rutile paint to 82.6%.

Lead, Carbonate
Zinc, Sulphide
Oxide, Galvanized
Steel, Solar
Reflectance
Pigments
White
Nitrocellulose
Acrylic

777 Metallic lead pigments

Aron. Paint Tech. Nov. 1961. 25 (11), 31-2. 1700 Words.

The article, which originates from Speithorne Metals Ltd., describes lead metallic pigments, their properties, major applications and typical formulations. The particles are 0.1-1.0 microns in diameter; they are compatible with a great variety of vehicles and, when dispersed, form stable suspensions. The finely divided metal offers cathodic protection to iron but can also stifle any anodic action, depending on the paint composition, age and environment. Original work is quoted and it is mentioned that lead soaps are formed with vegetable oil under the oxidizing influence of the atmosphere, strengthening the film and providing anodic inhibition.

Pigments
Lead
Properties
Uses
Composition
Cathodic
Anodic
Protection
Soaps
Dust

778 CP 143: Part 2: 1961 Sheet roof and wall coverings. Part 2: Galvanized corrugated steel

Published by the British Standards Institution. Num. Figs. and Tables. 29 pp.

Recommendations are given on materials and design, construction and maintenance together with information on weather-tightness, durability, thermal insulation, fire hazard, rainwater

Galvanized
Corrugated

Steel, Paint
Zinc, Dust
Oxide, Chromate
Calcium, Plumbate
Lead, White
Red, Rolled
Plates and sheets
Uses, Buildings
Flashings
Gutters

drainage for roofs, and other characteristics. Standardized forms of building already covered by British Standards are not considered. Paints suitable for use on new galvanized sheets include those based on zinc dust, zinc oxide, calcium plumbate, zinc chromate, pigmented zinc chromate/red oxide of iron, red lead and mixtures of red lead and white lead. Lead-based paints should be avoided when rainwater drains into storage vessels. Recommendations relating to lead sheeting used for flashings and gutters are also made.

Railways
Corrosion
Lead
Red
Primers
Phthalate
Resin
Vehicles (paint)
White

779 Rostschutz im Stahlbau

(Corrosion protection in steel construction) H. Hebberting. *Werkstoffe u. Korrosion* (Germany). June 1961. 12 (6), 360-1. 3 illus. 1000 Words (in German).

This article concludes one published in March 1960 (pp. 145-7), and is based on the experience of the German Federal Railways. Corrosion under the paint layer may render any coating useless. Red lead (concentrated or dispersed) is a good adhesive primer. For painting in changeable weather conditions, fast drying is a valuable property, and phthalate resins are useful since they can form lead soaps. In suitable binders red lead is also good for underwater structures. The chemical activity of white lead gains importance in top coats.

Lead Chemicals

Lead
Tetra-
Ethyl
Petrol
Carboxylic
Acid
Mono-
Alkyl

794 Patent 880,457 Improved motor fuels

California Research Corp. Oct. 25th, 1961.

The knock-suppressing action of lead tetraethyl in high octane gasolines (petrols) can be enhanced by addition of certain gasoline-dispersible monocarboxylic acids, or other substances which generate these acids in the conditions pertaining inside the combustion chamber. The improvement is stated to be possible only with leaded gasolines. Usual amounts of lead tetraethyl are needed, though other lead tetra alkyl compounds can be used in place of TEL.

Lead
Tetra-
Ethyl
Polymerisation
Catalysts

751 Patent 880,918 Organometallic polymers

Ethyl Corp. Oct. 25th, 1961.

Polymers made from organometallic compounds of metals of groups III-VII and some others are the subject of this claim. Each monomeric unit contains a pair of metals, one of which may be lead. Examples of such polymers are given. Lead tetraethyl can be used as catalyst.

Electronic Applications

Lead, Alloy
Solder, Gold
Antimony

782 Patent 879,656 Improvements in or relating to the production of electric semi-conductor devices

Siemens-Schuckertwerke A.G. Oct. 11th, 1961.

A process is described for the production of a semi-conductor device comprising a monocrystalline semi-conductor member provided with at least one p-n junction and an electrode made of

an alloy containing more than 50% by weight of gold. A solder composed of 75% lead, 17% gold and 8% antimony by weight is used to solder electrically conductive elements to the electrode.

Semiconductors
Uses
Electrical uses

763 Isotope generators for land and space

Anon. Nuclear Engng. Aug. 1967. 6 (67), 328. 4 illus. 500 Words.

The article describes two radioactive isotope-fuelled generators, one used in the U.S. Navy 'Transit' satellite, and the other employed in a weather station transmitter unit in northern Canada. The weather station generator, expected to operate for at least 2 years, employs ^{90}Sr as the fuel and incorporates 60 pairs of lead telluride thermocouples disposed in a 'hedgehog' fashion around the fuel unit. The positive elements of the thermocouples are doped with 1% sodium and the negative elements with 0.03% lead iodide. Temperatures of the hot and cold junctions are 427°C and 60°C respectively and the output is about 3W at 4V, which is converted to 28V to charge the Ni/Cd cells used. The generator is surrounded by 4.4 in. thick lead shielding.

Isotope
Fuel
Generators
Lead
Telluride
Thermocouples
Shielding
Uses
Electrical uses
Iodide

764 Patent 881,476 Improvements in or relating to ceramic dielectric materials

M. H. Francombe and B. Lewis. Nov. 1st, 1967.

An improved way of preparing the ceramic dielectric material of composition $\text{Pb}_{1-x}\text{Ba}_x\text{Nb}_2\text{O}_7$ is claimed, with x between 0.25 and 0.5. Some applications are described of lead barium niobate thus prepared, specifically with $x = 0.3, 0.4, 0.45$ and 0.5 .

Lead
Barium
Niobate
Dielectric
Ceramic

765 Patent 881,472 Improvements in and relating to luminescent screens

M. J. Tard Ltd. Nov. 1st, 1967.

Claims are made for a two layer luminescent screen designed to show the superlinear efficiency increase effect on excitation with cathode rays. The first luminescent layer, composed of barium silicate activated with lead, supplies exciting radiation to the second layer, composed of zinc cadmium sulphide activated with silver and nickel, and shields it from the incident electrons. A filter arrangement permits passage only of the radiation emitted by the second luminescent layer.

Luminescent Screens
Barium Silicate
Activation
Zinc Cadmium
Sulphide
Cathode Rays
Silver Nickel
Lead

766 Patent 886,963 Improvements in or relating to ferromagnetic ferrite materials

Philips Electrical Industries Ltd. Oct. 25th, 1967.

Claims are made for an improved ferromagnetic ferrite material composed of 2-21 mol % of AO , 5-45 mol % of MeO and 52-83 mol % of Fe_2O_3 , 'A' represents at least one of the metals Ba, Sr, Pb and Ca, and 'Me' at least one of the divalent metals Fe, Mn, Co, Ni, Zn, Mg, Cu or the divalent complex $(\text{U}^{IV} + \text{Fe}^{III})_2$. The properties of the material include a saturation magnetisation of the same order of magnitude as that of the ferromagnetic ferrites with the spinel crystal structure.

Ferrite
Lead
Magnetic
Ferro-

Lead Production

Zinc
Lead
Cadmium
Separation
Liquid
Vacuum
Distillation

787 Patent 881,343 Improvements in or relating to the removal of cadmium from zinc
National Smelting Co. Ltd. Nov. 1st, 1961.

Details are given of a process for obtaining zinc from lead which contains zinc and cadmium. Molten lead is heated under vacuum to produce cadmium-containing zinc vapour which is then partially condensed by contact with a cooled solid body of zinc. The uncondensed vapour becomes enriched in cadmium and the condensed molten zinc is collected and heated by conduction from the molten lead; cadmium rich vapour is distilled off leaving substantially pure zinc. Cadmium is recovered from the cadmium-rich vapours by partial condensation on solid zinc-cadmium alloy.

Lead, Manufacture
Handling
Liquid

788 Patent 879,327 Improvements in or relating to apparatus for handling and transporting molten metals
Regie Nationale des Usines Renault. Oct. 11th, 1961.

It is claimed that, with the apparatus described, it is possible to receive and deliver molten metal irrespective of the height and accessibility of the furnace or receptacle.

Concrete
Strength
Porous
Elements
Metal
Refining
Liquid

789 Patent 879,448 Porous concrete element for the gaseous refining of molten metals

Institute de Recherches de la Siderurgie. Oct. 11th, 1961.

This invention relates to a type of concrete element which would retain its structural strength in contact with molten metal while providing numerous pores for gases or liquids. Fall in strength due to high temperature dehydration of concrete is counteracted by the ability of the material to rehydrate itself gradually. The porous element is lined with a fluid-tight concrete on all sides, save the one in contact with molten metal. There are in it channels for uniform distribution of gas or liquid to its surface.

Copper
Lead
Arsenic
Antimony
Oxide
Concentration
Separation

790 Metall-Schlacken-Gleichgewichte der Systeme Cu-Pb-As-O und Cu-Pb-Sb-O

(Metal-slag equilibria of the Cu-Pb-As-O and Cu-Pb-Sb-O systems)
K. Heinrich, F. Pawlek and K. Pinth. Erzmetall (Germany). Oct. 1961. 14 (10), 520-6. 11 Figs. 3 Tables. 2500 Words (in German).

In the two quaternary systems all the possible stoichiometric combinations of the metallic oxides are discussed, and also their combination with aluminium oxide from the crucible. The fact that partition coefficient of lead depends on concentration is exceptional, since for arsenic and tin the partition coefficient is constant. With respect to copper, the lead is non-ionically bound and the other two metals are free as ions.

are mentioned. When lead is incorporated as dust in a paint vehicle, it offers protection to exposed structures. Other paint systems include lead oxides.

738 Pliable lead linings protect stackwork

Anon. *Metal Ind. Ncr.* 10th, 1961. 99 (19), 381. 1 illus. 140 Words.
Uni-Tubes Ltd. now produce a lead lined pliable flue lining tube said to resist attack from the most corrosive condensation which can be expected from the flue gases of gas-fired heating appliances. The tube, intended for the protection of chimney stack brickwork, is manufactured in coils up to 100 ft in length with 3 in., 3½ in., 4 in., 5 in., 6 in. and 7½ in. internal diameters. The bending radius of the tube, taken at its centre line, is 2½ times the diameter of the tube.

Lead
Tubes and pipes
Uses
Buildings
Flues
Lining

798 Patent 898,519 Improvements relating to anodes for use in electrolytic protection systems

Cathodic Corrosion Control Ltd. Oct. 25th, 1967.

A method is claimed for the manufacture of an anodic element for use in impressed current electrolytic protection systems. The element is in the form of a cable consisting of a metal core covered with lead-silver-antimony alloy containing 0.25% to 3% silver and up to 10% antimony. The lead covering is applied to the core by an extrusion process. In electrolyte liberating oxygen, a film of electrically conducting lead peroxide builds up on the surface of the element and progressively less lead alloy is consumed.

Lead
Alloy
Silver
Antimony
Anode
Per-
oxide
Sheathing
Cables

808 The determination of copper in lead and lead cable-sheathing alloys

J. H. Thompson and M. J. Revenscroft. Analyst. Oct. 1968. 85 (1015), 735-8. 1 Table. 2000 Words.

The sample is dissolved in H₂O₂-acetic acid mixture and converted to a chloride solution. Copper is extracted with diethyl-ammonium diethyldithiocarbamate in CCl₄. The organic ligands are destroyed with sulphuric-nitric acid mixture and the pH is adjusted to 8.0-8.5. Copper is determined spectrophotometrically as the blue (595 mμ) bis(cyclohexanone oxalyldihydrazone) complex. The usual amounts of other metals do not interfere.

Physics, Chemistry
and Analysis of Lead

Analysis of lead
Copper
Alloy
Cables
Sheathing
Spectrophotometric

891 Use of rotating hanging mercury drop in analysis — Anodic stripping using a rotating mercury drop; Trace analysis with a rotating hanging mercury drop

J. J. Engelismen and A. M. J. M. Claessens; M. van Sway and R. S. Deelder. Nature. July 15th, 1967. 191 (4785), 240-2. 3 Figs. 1200 Words.

The first communication describes a refined technique, by which a rotating drop of mercury is scanned at a rate of 5 mV/sec. for 5 min. at -1.8V with respect to silver/silver chloride electrode.

Analysis for zinc
Hanging drop mercury
electrode
Rotating

Zinc
Cadmium
Lead
Copper
Coulometric
Polarographic

Anodic current peaks for zinc, cadmium, lead and copper have been obtained. The second communication deals with the application of this technique to trace analysis. The authors call the method 'coulometric polarography'. As extreme purity of the solution and of the nitrogen atmosphere around it is necessary, some difficulties are being experienced. However, zinc ions at a concentration of 5×10^{-7} M can be determined.

Lead
Carbonate
Infrared
Spectrographic
Examination

802 A difference band of a fundamental and a lattice mode in the infra-red spectra of lead and other carbonates
C. J. M. Schutte and K. Buijs. *Nature*. Oct. 28th, 1961. 192 (4800), 351-2. 1 Fig. 1 Table. 300 Words.

The results of this study suggest that the difference band found at the frequency of 848 cm^{-1} in lead carbonate and several carbonates and nitrates of other metals occurs in the infra-red spectra of all crystals containing planar XO_3 ions.

Reaction
Electroplating
Tanks
Liquid
Zinc
Lead
Salts
Mechanism
Interface

803 On the resistivity of various materials to attack by molten salts and metals

A. Lunden. *Corrosion Science*. Aug. 1961. 1 (1) 62-4. 2 Tables. 550 Words.

The author summarizes investigations on the attack on various container materials by molten metals and salts which include PbBr_2 , PbCl_2 , $\text{CdCl}_2/\text{LiCl}$, ZnBr_2 , and ZnCl_2 . References are given for results obtained with cadmium, lead and zinc metals. In the course of the investigations lead iodide was observed to decompose to some extent on fusion under a vacuum. In general the attack on the container was found to be strongest at the interface between the melt and the surrounding atmosphere. The attack is often due to compounds formed at the cathode during electrolysis and in some cases the attack is located at a section where a highly reactive compound has been concentrated due to the relative mobility of its ions. There is some evidence that the presence of an electric field might have a tendency in itself to increase the reactivity.

Miscellaneous

Lead
Toxicity
Glass
Wine

804 A rare source of lead poisoning

Anon. *New Scientist*. Oct. 26th, 1961. 12 (258), 253. 100 Words.

A case of lead poisoning after consumption of home-made wine fermented in an old glass vessel was found to be due to the dissolution of lead in the glass by the acetic and tartaric acids of the wine. The patient was successfully treated with calcium disodium versenate.

771 Schmelzflusselektrolytische Gewinnung von Blei und Antimon aus Sulfidischen Konzentraten

(Production of lead and antimony from sulphide concentrates by electrolysis of fused melts) R. Kanimell. *Erzmetall* (Germany). Oct. 1961. 14 (10), 497-508. 6 Figs. 5 Tables. 7000 Words (in German).

The reduction of heavy-metal sulphides by electrolysis of fused melts is reviewed. Their reduction behaviour and reactions result from the mutually opposed properties of sulphides and electrolytes. This is demonstrated using as examples three simplified electrolysis systems. Laboratory scale research on the direct production of lead and antimony from sulphide raw materials by electrolysis of fused melts has shown that the separation of these metals in good yield is possible with high current efficiency.

Lead
Sulphide
Electrolysis
Concentration
Fused
Melts

782 Flotationsversuche mit Xanthogensäuren

(Flotability of sulphide minerals using xanthic acids as collector) H. Mayima. *J. Min. Met. Soc. Japan*. 1961. 77 (871), 38-47. *Erzmetall* (Germany). Oct. 1961. 14 (10), 528. (Seen in abstract form only.)

The paper gives data for galena and covellite on the relationship between flotation and co-ordination constants of chelates, critical values of pH, dissociation values of xanthic acids, and the formation constant of lead xanthate. The order in which additions of alkalis and xanthic acids are made affects their effectiveness.

Lead, Sulphide
Flotation
Xanthic Acid
Chelates, Dissociation
Rate

793 Refining lead

J. F. Holmes. *Metal Ind.* Aug. 11th, 1961. 90 (6), 110-2; Aug. 18th, 1961. 90 (7), 124-6. 4 Tables. 5000 Words.

Methods used for the removal of bismuth from lead are surveyed. Pyrometallurgical and electrolytic processes are considered and a separate section deals with the preparation of the calcium lead alloy used in the Kroll-Betterson process.

Removing, Bismuth
Lead, Electrolytic
Heating, Separation
Process

794 Contribuții cu privire la natura și posibilitățile de valorificare a speisului de la uzinele de plumb din regiunea Maramureș

(Contributions to the study of the nature and possibilities of utilisation of speiss from lead works in the Maramures region) A. Lupu and L. Drăgan. *Stud. Cerc. Metal. (Romania)*. 1961. 4 (2), 193-208. 9 illus. 16 Figs. 2 Tables. 2500 Words (in Rumanian).

The authors have studied 'tarces', a material similar to speiss, which is obtainable by reductive fusion of lead concentrates from the region of Maramures. It contains 36-40% copper and 18-21% lead, with sulphides, arsenides and oxides of copper and iron. Duration and optimum temperature of roasting, and liquid-solid ratio, acidity and duration of leaching were investigated to evaluate the possibility of hydrometallurgical extraction of copper.

Lead
Roasting
Leaching
Recovery
Copper
Speiss

Metallurgy and Mechanical Properties of Lead

Gallium
Lead
Cadmium
Alloy
Analysis
Thermal

The results are given graphically and microphotographs are reproduced. It is concluded that the material is not a typical speiss, but intermediate between copper-matte and speiss with a copper-bearing outer crust, containing metallic impurities and sulphides. Hydrometallurgical extraction of copper is only 80% effective and not as high as a pyrometallurgical procedure. It is advisable to work to a 90-95% separation; volatilization and electrical purification of lead should follow.

795 Die Gleichgewichtsverhältnisse im System Gallium-Blei-Kadmium

(Equilibrium ratios in the gallium-lead-cadmium system) B. Predel. *Z. Metallkunde* (Germany). Aug. 1961. 52 (8), 607-11. 18 Figs. 2000 Words (in German).

A differential thermal analysis was made of the gallium-lead-cadmium system. The ternary eutectic point was found at 99.63 at. % Ga and 29.28°C. A liquid miscibility gap extends from the binary systems Ga-Cd and Ga-Pb across the ternary concentration range. The connecting line of the critical points shows a temperature minimum near the binary system Ga-Cd, indicating a lower liquefaction tendency in the ternary system range than in the two binary systems Ga-Pb and Ga-Cd. A narrowing of the liquid two-phase region occurs in the concentration plane at this temperature minimum.

796 Purificazione delle leghe mediante separazione delle fasi

(Purification of alloys by phase separation) P. Gondi and G. Scaccati. *Metallurgia Italiana*. Oct. 1961. 53 (10), 539-46. 13 Figs. 14 Tables. 3500 Words (in Italian).

Experiments aimed to separate phases by pressure and by centrifuge were made on alloys of zinc, cadmium and lead. Results are tabulated and shown in the form of phase diagrams. Purification of alloys with low concentration of zinc, cadmium or lead can also be achieved because the phases do not interdiffuse.

Corrosion

History
Lead
Corrosion
Resistance
Oxid
Paint
Oxide

797 Lead

G. Vestey. *Corrosion Prevention and Control*. Nov. 1961. 8 (11), 33-5. 7 illus. 1300 Words.

The history, properties and applications of lead are reviewed. Corrosion resistance of lead is due to the formation of a protective film with certain acids. High purity metal is not needed for this purpose, and the early B.S. 334 specified chemical lead as either 99.99% pure or alloyed, without defining the composition of the alloy. Alloys in common use are described. The atmospheric and sea corrosion rate of lead, in terms of percentage loss, is low, but acetic, formic and nitric acids give soluble salts and corrode lead quickly. Modern methods of welding, lining, spraying and coating

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