The role of arsenic in lead-acid batteries

How does arsenic affect a lead-antimony grid?

The presence of arsenic in the lead-antimony alloy has an effect on the corrosionof the grid which can be described as a reduction in the local corrosion at the crystal boundaries which is observed in arsenic-free grids and which leads to their premature disintegration.

Does arsenic affect electrode capacity?

When the active-mass density is close to the critical value (d = 3.80 g cmWs), however, the influence of arsenic is not observed. Indeed, a decrease in capacity occurs. An increase in the arsenic concentration of the alloy from 0.2 to 0.8 wt.% has only a slight influence on the electrode capacity after 20 cycles.

Can arsenic trioxide be used to treat acute promeylocytic leukemia?

Recently, arsenic trioxide has been approved by the Food and Drug Administration as an anticancer agent in the treatment of acute promeylocytic leukemia . Its therapeutic action has been attributed to the induction of programmed cell death (apoptosis) in leukemia cells .

Why is corrosion layer formed during battery operation?

The corrosion layer is formed during battery operation due to the thermodynamic instabilityof the grid at the positive-plate potentials. During charge and discharge,the elec-tric current flows consecutively through these elements.

What factors affect lead absorption?

Lead absorption is influenced by factors such as age and physiological status. In the human body,the greatest percentage of lead is taken into the kidney,followed by the liver and the other soft tissues such as heart and brain,however,the lead in the skeleton represents the major body fraction .

Do metals interact with cadmium & arsenic?

A recent review of a number of individual studies that addressed metals interactions reported that co-exposure to metal/metalloid mixtures of arsenic,lead and cadmium produced more severe effectsat both relatively high dose and low dose levels in a biomarker-specific manner .

The addition of arsenic (0.15-0.25%) improves the corrosion resistance of lead-antimony alloys drastically. As will be discussed later, valve-regulated batteries must be operated at considerably higher float voltages than tubular (flooded) batteries, in order to avoid sulfation of the negative plates. The float voltage recommended for valve-regulated batteries is ...

Corrosion of lead-arsenic alloys. Corrosion of Pb-As alloys (As = 0.1, 0.2, 0.3 and 0.4%) in 5.0 M H 2 SO 4 solutions at 30 °C was studied under open-circuit, potentiostatic and galvanostatic polarization conditions.

In most cases, these phenomena are linked to the use of antimony-free positive grids and are invoked by repetitive deep-discharge duties. This situation represents probably ...

The presence of arsenic in the lead-antimony alloy has an effect on the corrosion of the grid which can be described as a reduction in the local corrosion at the crystal ...

Antimonial lead alloys, which also contain some arsenic, have traditionally been used for the fabrication of lead-acid battery electrodes. The possible generation of arsine and stibine during battery operation must be considered in the development of batteries for electric vehicles, utility load-leveling, and solar electricity storage. Research ...

The aim of the present work is to study the effect of arsenic, antimony and bismuth (Group V metals) on the processes involved in the building up of the structure of the Pb02 active mass of lead/acid battery positive plates. Experimental Procedure The active mass of automotive battery plates was used in the investiga· tions. The charged active ...

Lead (Pb) is a potent neurotoxicant with no safe level of exposure. Elevated levels of Pb and arsenic (As) are found in the air and soil near facilities that recycle lead-acid batteries in the United States. In urban Los Angeles County, California, a facility processed ~11 million batteries per year ...

However, a higher As content will lead to a decrease in V th, ... The role of arsenic in the operation of sulfur-based electrical threshold switches. Nat Commun 14, 6095 (2023 ...

Yang C. Technique for Producing Lead-Calcium Alloy Using Waste Lead Grids of Waste Lead-Acid Storage Batteries. WO2019223560A1. Patent. 2019 May 12; 40. Wie Z., Liu D., Wei Y. Process Method for Producing Low-Tin Lead-Calcium Alloy by Using Waste Lead-Acid Storage Battery Waste Lead Grid. CN113178636A. Patent. 2021 April 27; 41.

We have also shown that oxidative stress plays a key role in arsenic induced cytotoxicity, a process that is modulated by pro- and/or anti-oxidants such as ascorbic acid and n-acetyl cysteine [84-86].

Lead Alloys: Alloying, Properties, and Applications. J.F. Smith, in Encyclopedia of Materials: Science and Technology, 2001 2 Major Applications 2.1 Storage Battery Alloys. By far the dominant use for lead worldwide is in the storage battery, including starting-lighting-ignition (SLI), and a wide range of stationary and motive power industrial batteries.

Corrosion of lead-arsenic alloys. Corrosion of Pb-As alloys (As = 0.1, 0.2, 0.3 and 0.4%) in 5.0 M H 2 SO 4 solutions at 30 °C was studied under open-circuit, potentiostatic and galvanostatic ...

The electrochemical behaviour of some Pb-Cu alloys (Cu = 0.008 - 0.06 %) in 5.0 M H2SO4 solutions was

studied to explore the role of copper on the performance of grids of lead-acid batteries...

Arsenic affected the electrochemical behaviour of lead in 5.0 M H2SO4 solutions. It increases the sulfatian process under open-circuit conditions and the corrosion laver is com-. ...

Antimonial lead alloys, which also contain some arsenic, have traditionally been used for the fabrication of lead-acid battery electrodes. The possible generation of arsine and stibine during ...

Recycling concepts for lead-acid batteries. R.D. Prengaman, A.H. Mirza, in Lead-Acid Batteries for Future Automobiles, 2017 20.8.1.1 Batteries. Lead-acid batteries are the dominant market for lead. The Advanced Lead-Acid Battery Consortium (ALABC) has been working on the development and promotion of lead-based batteries for sustainable markets such as hybrid ...

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