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TRANSLATION

ENGLISH TITLE: A SINTERED-METAL NICKEL-OXIDE ELECTRODE OF AN ALKALI STORAGE CELL

FOREIGN TITLE: METALLOKERAMICHESKIY OKISNO-NIKELEVY ELEKTROD SHCHELOCHNOGO AKKUMULYATORA

AUTHOR: Yu. M. Pozin, et al.      LANGUAGE: Russian  
 SOURCE: USSR Patent 266001,      TRANSLATOR: Leo Kanner Associates  
           17 Mar 70  
 REQUESTOR: AMXST-GE Mr. Busi

ABSTRACT:

A sintered-metal nickel-oxide electrode of an alkali storage cell has a surface layer, thickness 0.0-0.2 mm, consisting of 0.05-0.15% higher oxides of nickel NiOOH, rather than 0.3-0.5%, in order to increase its service life.

KEY WORDS:

Battery Electrode  
 Storage battery  
 Nickel oxide  
 Sintered metal

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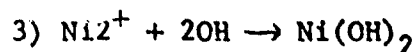
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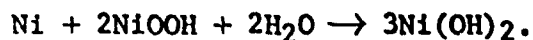
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A sintered -metal nickel-oxide electrode of an alkali storage cell, designed as a porous sintered nickel base packed with an active mass of hydroxide of nickel  $\text{Ni(OH)}_2$  with an addition of 0.3-0.5% of higher oxides of nickel  $\text{NiOOH}$  is well known.

When there is lengthy storage in the air, for example for a period of 1 or 2 months, green spots appear on its surface. Storage cells with such electrodes fail very quickly as a result of short circuiting. Short circuiting occurs because of a break in the positive electrodes in places where the green spots appear; these spots are marks of a corrosion breakdown of the porous base of the electrode according to the system:



Total reaction:



In this way, corrosion of the nickel plate occurs because of the presence in its pores, of a certain quantity of higher oxides of nickel.

The purpose of the invention is to increase the service life of the storage cell.

For this, we propose a surface layer of an active mass on the electrode, to a depth of 0.1-0.2 mm, to be carried out with contents 0.05-0.15% of higher oxides of nickel  $\text{NiOOH}$ .

Corrosion of the surface of such electrodes is insignificant and does not lead to the appearance of green spots and a breakdown in the entire electrode. Corrosion of the internal layer of the electrode proceeds at a fairly fast

rate; however, it does not lead to a breakdown inasmuch as the external surfaces of the electrode remain sufficiently stable.

A decrease in the quantity of NiOOH in the interior layer of the active mass is undesirable, because it makes the process of forming worse.

Preparing such an electrode can be done by additional processing with a solution of a reducing agent of the electrode, obtained by the usual method, that is, having an even distribution of 0.3-0.5% NiOOH, at all depths. For example, one can immerse the electrode for 0.5-1.0 hours in a 5% solution of Formalin in 25% NaOH, as a result of which the higher oxides of nickel on the surface layers of the electrode to a depth of 0.1-0.2 mm are partially reduced to Ni(OH)<sub>2</sub> and their contents are lowered to the required amount (0.05-0.15 by weight, % in a scale for active oxygen).

Such an effect can be obtained by another method; for example, having held the electrode cathode polarized in a solution of KOH during potential separation of hydrogen. In this case, the higher oxides of nickel are reduced to hydroxide of nickel by a gas-forming hydrogen, while as a result of this, separation of the hydrogen is observed, mainly on only the surface layers of the electrode; the reduction of oxides of nickel also occurs only on the external layers of the electrode to a depth of 0.1-0.2 mm.

In the latter case, the length of cathode polarization must be such that the electrode collects a quantity of electricity equal to 10-30% of the size of the charge capacity of the electrodes.

Object of the invention. A sintered-metal nickel-oxide electrode of an alkali storage cell, designed as a porous sintered nickel base, packed with an active mass of hydroxide of nickel Ni(OH)<sub>2</sub> with an addition of 0.3-0.5% oxides of nickel NiOOH, is changed in that, the surface layer of the electrode indicated has an active mass with a thickness 0.1-0.2 mm consisting of 0.05-0.15% of higher oxides of nickel NiOOH, in order to increase its service life.