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PATENT APPLICATION  
Mo6398  
STA-154

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

APPLICATION OF	)	
VIKTOR STOLLER ET AL	)	U.S. PATENT 6,849,208
SERIAL NUMBER: 09/868,995 ✓	)	ISSUED: FEBRUARY 1, 2005
FILED: JUNE 20, 2001	)	
TITLE: NICKEL MIXED HYDROXIDE,	)	
METHOD FOR PRODUCING THE	)	
SAME, AND THE USE THEREOF AS	)	
A CATHODE MATERIAL IN	)	
ALKALINE BATTERIES	)	

**CERTIFICATE OF CORRECTION UNDER 37 C.F.R. §1.323**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Correction to the subject patent is respectfully requested relative to a mistake made by Applicants, and a mistake made by the Office.

**Remarks** begin on page 2 of this paper.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an enveloped addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 3/24/05

Date  
James R. Franks, Reg. No. 42,552  
Name of applicant, assignee or Registered Representative  
*James R. Franks*  
Signature  
March 24, 2005  
Date

### REMARKS

Please correct Claims 1 and 9 as indicated on the Certificate of Correction sheet included herewith.

In accordance with the requirements of 35 U.S.C. § 255, Applicants provide the following showing that the mistake as to Claims 1 and 9, with regard to the line separating the numerator from the denominator in Equation (I), occurred in good faith. The mistake in the mathematical formula of Claims 1 and 9 occurred due to the unclear manner in which Applicants presented the amendments to Claims 1 and 9 in an Amendment dated 5 December 2003. Pages 2, 3 and 4 of the Amendment of 5 December 2003 are included herewith in the appendix. In Applicants' Amendment of 5 December 2003, the line separating the numerator from the denominator of Equation (I) was not clearly represented. Attention is also directed to page 5, line 27 of the specification.

In addition, in the denominator of Equation (I) of Claims 1 and 9:  $M_a^{+x}$  should be replaced with  $M_a^{+x}$  (i.e., without a "prime" after the superscripted +x). This is deemed to be a mistake by the Office. Attention is directed to pages 2-4 of Applicants' Amendment of 5 December 2003, and page 5, line 27 of the specification.


Inclusion of the line separating the denominator and numerator of Equation (I) of Claims 1 and 9 is not deemed to represent the entry of new matter or to require reexamination. Removal of the "prime" from the denominator of Equation (I) is not deemed to represent the entry of new matter or to require reexamination.

In light of the preceding remarks, Equation (I) in each of Claims 1 and 9 should appear as follows.

$$\alpha = \frac{M_a^{+(x+1)}}{M_a^{+(x+1)} + M_a^{+x}} \quad (I)$$

In light of the showing in accordance with 35 U.S.C. § 255, the preceding remarks, and the concurrent authorization for the Office to deduct payment of the fee under 37 C.F.R. § 1.20(a) from Applicants' deposit account 13-3848, entry of the present Certificate of Correction is respectfully requested.

Respectfully submitted,

By   
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IN THE CLAIMS

Please cancel Claim 16.

Please amend Claims 12, 18 and 21.

1-11 (Cancelled)

12. (Currently Amended) Nickel mixed hydroxide with Ni as the main element and with a layer structure, comprising

a) at least one element  $M_a$  from the group comprising Fe, Cr, Co, Ti, Zr and Cu which is present in two different oxidation states which differ by one electron in terms of the number of outer electrons, wherein the degree of oxidation  $\alpha$  of the element  $M_a$ , defined according to the following formula (I), is from 0.25 to 0.75

$$\alpha = \frac{M_a^{+(x+1)}}{M_a^{+(x+1)} + M_a^{+x}} \quad (I).$$

wherein  $M_a^{+(x+1)}$  means the molar quantity of the element  $M_a$  in the higher oxidation state, and  $M_a^{+(x)}$  the molar quantity of the element  $M_a$  in the lower oxidation state, and x is a number between 1 and 3;

- b) at least one element  $M_b$  from the group comprising B, Al, Ga, In and rare earth metals present in the trivalent oxidation state;
- c) optionally at least one element  $M_c$  from the group comprising Mg, Ca, Sr, Ba and Zn present in the divalent oxidation state;
- d) apart from the hydroxide, at least one additional anion selected from the group consisting of halides, carbonate, sulfate, acetate, oxalate, borate and phosphate in a quantity sufficient to preserve the electroneutrality of the mixed hydroxide; and
- e) water of hydration in a quantity which stabilizes the relevant structure of the mixed hydroxide.

13. (Previously Presented) The nickel mixed hydroxide according to Claim 12, wherein the proportion of Ni is from 60 to 92 mol % and the total proportion of the elements  $M_a$ ,  $M_b$  and  $M_c$  is from 40 to 8 mol %, in each case based on the total amount of Ni,  $M_a$ ,  $M_b$  and  $M_c$ .

14. (Previously Presented) The nickel mixed hydroxide according to Claim Mo-6398

12, wherein the proportion of the element  $M_a$  is from 10 to 40 mol %, based on the total amount of the elements  $M_a$ ,  $M_b$  and  $M_c$ .

15. (Previously Presented) The nickel mixed hydroxide according to Claim 12, wherein the proportion of the element  $M_c$  is from 1 to 30 mol %, based on the total amount of elements  $M_a$ ,  $M_b$  and  $M_c$ .

16. (Cancelled)

17. (Previously Presented) The nickel mixed hydroxide according to Claim 12, wherein the nickel mixed hydroxide is in the form of a powder with an average particle size from 1 to 100  $\mu\text{m}$ .

18. (Currently Amended) The nickel mixed hydroxide according to Claim 12, wherein the rare earth metals of the element  $M_b$  are selected from the group consisting of Sc ~~Sc~~, Y and La.

19. (Previously Presented) The nickel mixed hydroxide according to Claim 12, wherein the halides are selected from the group consisting of fluoride and chloride.

20. (Previously Presented) The nickel mixed hydroxide according to Claim 12, wherein the nickel mixed hydroxide is a cathode material in an alkaline battery.

21. (Currently Amended) A process for preparing a nickel mixed hydroxide with Ni as the main element and with a layer structure, comprising:

a) at least one element  $M_a$  selected from the group consisting of Fe, Cr, Co, Ti, Zr and Cu which is present in two different oxidation states which differ by one electron in terms of the number of outer electrons, wherein the degree of oxidation  $\alpha$  of the element  $M_a$ , defined according to the following formula (I), is from 0.25 to 0.75

$$\alpha = \frac{M_a^{+(x+1)}}{M_a^{+(x+1)} + M_a^{+x}} \quad (I).$$

wherein  $M_a^{+(x+1)}$  means the molar quantity of the element  $M_a$  in the higher oxidation state, and  $M_a^{+(x)}$  the molar quantity of the element  $M_a$  in the

lower oxidation state, and x is a number between 1 and 3;

- b) at least one element  $M_b$  from selected from the group consisting of B, Al, Ga, In and rare earth metals present in the trivalent oxidation state;
- c) optionally at least one element  $M_c$  selected from the group consisting of Mg, Ca, Sr, Ba and Zn present in the divalent oxidation state;
- d) apart from the hydroxide, at least one additional anion selected from the group consisting of halides, carbonate, sulfate, acetate, oxalate, borate and phosphate in a quantity sufficient to preserve the electroneutrality of the mixed hydroxide; and
- e) water of hydration in a quantity which stabilizes the relevant structure of the mixed hydroxide,

the process comprising reacting components required to obtain the relevant mixed hydroxides in the form of water-soluble salts of Ni and of the elements  $M_a$ ,  $M_b$  and optionally  $M_c$  in a basic, aqueous medium for the co-precipitation of hydroxide reaction products with the formation of a homogeneous suspension of said reaction products,

wherein either water-soluble salts of the element  $M_a$  are used in different oxidation states or a water-soluble salt of the element  $M_a$  is used in the lower oxidation state and a partial oxidation is carried out until the desired ratio is obtained between the different oxidation states of the element  $M_a$ , or a water-soluble salt of the element  $M_a$  is used in the higher oxidation state and a partial reduction is carried out until the desired ratio is obtained between the different oxidation states of the element  $M_a$ , separation of the water from the suspension, and drying of the reaction products.

22. (Previously Presented) The process according to Claim 21, wherein at least one of the reaction components is introduced into the aqueous medium by anodic oxidation of the corresponding metal.

23. (Previously Presented) The process according to Claim 21, wherein the reaction is carried out at a pH from 8 to 13.

24. (Previously Presented) The process according to Claim 21, wherein

## UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO : 6,849,208  
 DATED : February 1, 2005  
 INVENTOR(S) : Viktor Stoller et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Claim 1, at column 12, line 20, delete Equation (I) and insert the following:

$$\alpha = \frac{M_a^{+(x+1)}}{M_a^{+(x+1)} + M_a^{+x}} \quad (I)$$

In Claim 9, at column 13, line 10, delete Equation (I) and insert the following:

$$\alpha = \frac{M_a^{+(x+1)}}{M_a^{+(x+1)} + M_a^{+x}} \quad (I)$$

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PATENT NO. 6,849,208

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This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.