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## Formation of nickel hydroxosalts

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*The article presents the results of chemical synthesis of nickel hydroxosulfate in the concentrated solutions of nickel sulfate. We obtained hydroxisulfates of the following composition:  $Ni(OH)_x(SO_4^{2-})_{(2-x)/2} \cdot yH_2O$ , where  $0,9 \leq x \leq 1,5$ . The quantity of adsorbed and chemical adsorbed waters was estimated. The formation mechanism of hydroxisulfate in the concentrated solution of initial salt is offered.*

**Keywords:** hydroxisulfate nickel, nickel hydroxide, precipitation conditions.

### REFERENCES

- [1] Portemer F., Delahaye-Vidal A., Figlarz M. Characterization of active material deposited at the nickel hydroxide electrode by electrochemical impregnation. *J. Electrochem. Soc.*, 1992, vol. 139, no. 3, pp. 671–678.
  - [2] Sulegin D.A., Yurasova I.I. *Inzhenernyzhurnal: nauka i innovatsii – Engineering Journal: Science and Innovation*, 2013, iss. 6. Available at: <http://engjournal.ru/catalog/fundamentals/chem/791.html>
  - [3] Faure C., Delmas C. Characterization of a turbostratic  $\alpha$ -nickel hydroxide quantitatively obtained from an NiSO<sub>4</sub> solution. *J. Power Sources*, 1991, vol. 35, pp. 279–290.
  - [4] Oliva P., Leonardi J., Laurent J.F., Delmas C., Braconnier J.J., Figlarz M., Fievet F., de Guibert A. Review of the structure and the electrochemistry of nickel hydroxides and oxy-hydroxides. *J. Power Sources*, 1982, vol. 8, pp. 229–255.
  - [5] Näsänen R., Tamminen V. *J. Amer. Chem. Soc.*, 1949, 1997, vol. 71, pp. 1994–1997.
  - [6] Martynenko L.A. *Zhurnal neorganicheskoi khimii — Russian Journal of Inorganic Chemistry*, 1970, vol. 15, no. 6, pp. 1533–1537.
  - [7] Tikhonov A.A., Vitchenko N.K., Talalaeva O.D., Yashkova P.I. *Zhurnal neorganicheskoi khimii — Russian Journal of Inorganic Chemistry*, 1957, vol. 2, no. 9, pp. 2196–2201.
  - [8] Makovskaya G.V., Spivakovskiy V.B. *Zhurnal neorganicheskoi khimii — Russian Journal of Inorganic Chemistry*, 1974, т. XIX, вып. 12, pp. 3207–3212.
  - [9] Ramesh T.N., Kamath P.V. Temperature-induced control over phase selection among hydroxides of nickel. *Bull. Mater. Sci.*, 2008, vol. 31, pp. 169–172.
  - [10] Wilbur J., Singley J., Carriel I.T., *J. Amer. Chem. Soc.*, 1953, vol. 75, pp. 778–784.
  - [11] Therese G.H.A., Kamath P.V., Gopalakrishnan J. *J. Solid State Chem.*, 1997, vol. 128, pp. 38–42.
  - [12] Louär D. Analyse des Profils de Diffraction des Rayons X d'un Hydroxynitrate de Nickel Non Stoechiometrique. *J. Solid State Chem.*, 1975, vol. 13, pp. 319–325.
  - [13] Rajamathi M., Subbanna G.N., Kamath P.V. On the existence of a nickel hydroxide phase which is neither  $\alpha$  nor  $\beta$ . *J. Mater. Chem.*, 1997, vol. 7(11), pp. 2293–2296.
  - [14] Delahaye-Vidal A., Beaudoin B., Sac-Epee N., Tekaia-Elhsissen K., Audemer A., Figlarz M. Structural and textural investigations of the nickel hydroxide electrode. *Solid State Ionic*, 1996, vol. 84, pp. 239–248.
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- [15] Ramesh T.N., Kamath P.V. Synthesis of nickel hydroxide: Effect of precipitation conditions on phase selectivity and structural disorder. *J. Power Sources*, 2006, vol. 156, pp. 655–661.
- [16] Shamina I.S., Kuchkaeva I.K., Rakhovskaya S.M. *Zhurnal fizicheskoi khimii* — *Journal of physical chemistry*, 1971, vol. XLV, no. 3, pp. 527–530.
- [17] Markov L., Dobreev H., Ioncheva R. Марков Л., Добреев Х., Йончева Р. *Zhurnal neorganicheskoi khimii* — *Russian Journal of Inorganic Chemistry*, 1987, vol. 32, iss. 3, pp. 688–693.
- [18] Lidin R.A., ed. *The constants of inorganic compounds. Dictionary*. Moscow, Drofa Publ., 2008, 685 p.
- [19] Krasnov K.S. *Fizicheskaya khimiya* [Physical chemistry]. In two books. Book 2. 3<sup>rd</sup> ed. Moscow, Vysshaya shkola Publ., 2001, 319 p.

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