

# Physico-Chemical nanomaterials science

## Ni-, Co-spinels for electrocatalysts of alkaline fuel elements

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Electrocatalytic processes are the basis of the various electrochemical devices, and today the relevance of such processes is increasing due to the development of resource-saving and environmentally friendly power sources. It is necessary to reduce the cost electrode materials for their use in high power applications. The alternative materials may be based on Ni-, Co-spinels [1,2].

It is reported 3d-metals oxides with the structure of spinel are effective electrocatalysts for reduction process of molecular oxygen. Cathodes from spinels can provide high electrochemical properties for chemical power sources, air (oxygen) electrode fuel cells and sensors with an alkaline electrolyte [3].

Therefore, the aim of this work was the determination and application of rational parameters of the Ni-, Co-spinels synthesis for creating of economic and highly efficient electrocatalysts.

For the Ni-, Co-spinels synthesis was chosen co-precipitation method of nitrates. In the first stage the saturated solutions of nickel and cobalt nitrate was mixed, which pH was adjusted to 9.0 and 10.0 with ammonium hydroxide solution and left for aging for 3, 6 and 7 days. The precipitate was filtered, dried (1 hour at a temperature 110 °C) and calcinated (3 hours at 350 °C).

1. *Krupennikova O.S., Pirskey Yu.K., Gaydin A.V., Ivanenko I.M., Dontsova T.A.* Electrocatalysts for oxygen reduction based on multilayered carbon nanotubes modified with cobalt and nickel oxides // *Ukr. Chem. J.*-2013.-**79**, N 5-6.-P. 107-110. (in Russian)
2. *Fedoruk K.O., Ivanenko I.M., Astrelin I.M., Burmak A.P.* Electrocatalysts based on the Ni-, Co-spinels // *Bull. Odessa Nat. Univ.*-2016.-**21**, N 2(58).-P. 74-83. (in Ukrainian)
3. *Pirskey Yu.K., Krupennikova O.S., Panchishin T.N., Ivanenko I.M., Dontsova T.A.* Cathodic composite electrocatalysts for oxygen reduction based on carbon nanotubes and Ni-, Co-spinels doped with silver.-2014.-**80**, N 11-12.-P. 26-30. (in Russian)