POSSIBILITY OF OBTAINING NANOCRYSTALS OF COPPER OXIDE IN THE PROCESS OF ELECTROPHORESIS IN A COLLOIDAL SOLUTION OF CARBON IN ETHANOL [[1]](#footnote-1)\*)

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Copper oxide Cu2O, which is a p-type semiconductor, has unique electrical, optical and magnetic properties. It is used to convert solar energy by photocatolysis and is a sensory antibacterial material. The fundamental properties of nano- and microcrystalline Cu2O structures strongly depend on their architecture and morphology. Recently, much attention has been paid to questions of Cu2O morphology[1].

There are various methods for producing oxide nanocrystals: pulsed electrodeposition, pyrolysis process, thermal oxidation from a catalyst, etc.

This work presents the results of preliminary experiments demonstrating the possibility of obtaining cubic Cu2O nanocrystals as a result of electrophoresis of a colloidal solution of nanocarbon in ethanol. The colloidal solution of nanocarbon was obtained using a high-voltage multi-spark discharge in ethanol with argon injection into the interelectrode space [2]. The discharge was formed using a high-voltage pulse generator with a storage capacitor energy E ~ 1,6 J, pulse repetition parameters f = 50 Hz, current and voltage amplitudes I ~ 250 ... 300 A, and U ~ 20 kV, respectively.

The colloidal solution is a disordered graphite (disordered graphite) with nanoparticles of sizes from several nm to 40 nm.

It was shown that colloidal particles have a charge. This was used to carry out electrophoresis. The experiment consisted of the following: a constant voltage of 200 V was applied to copper electrodes placed in a colloidal solution, measuring 2·3 cm2. In this case, a current of 2 mA was applied. As a result, nanocarbon particles were released on the positive electrode. The negative electrode remained practically "clean". After the end of the electrophoresis process, which lasted 30 minutes, the colloidal solution lost its stability and a significant part of it solidified into crystals. The study of the deposit and the film formed on the positive electrode was carried out by electron microscopy, X-ray diffractometry, etc. The results obtained suggest a possibility of formation of cubic Cu2O nanocrystals as a result of electrophoresis.

References

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1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/XLVIII/Pt/ru/GZ-Moryakov.docx) [↑](#footnote-ref-1)