DEPOSITION OF METAL-DOPED DIAMOND-LIKE FILMS USING A HOLLOW CATHODE DISCHARGE [[1]](#footnote-1)\*)

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Diamond-like coatings (DLC) are widely used due to their unique physical properties, such as chemical inertness, wear resistance, thermal conductivity, wide band gap, low threshold voltage for field electron emission, etc. The properties of DLC depend on the internal crystal structure and the presence of impurities in the films [1-3]. In particular, the effect of the reversible resistive switching [4] in nanocomposites (NC) based on the DLC [5] allows using them in the development of unit cells of non-volatile memory (memristors). In this case, switching occurs under the influence of an external electric field due to a local change in the type of hybridization in the film, as well as electromigration of anions (oxygen) and cations (metal impurities) [6]. Similar NC in the structure of the “metal-dielectric-metal" elements have a number of advantages compared with existing NC based on metal oxides [7–8]; these advantages are mainly associated with the unique properties of DLC.

In the work, a simple method for producing DLC with copper impurity by ion sputtering of the combined cathode in a hollow cathode discharge (HCD) [9–11]. The cathode is formed by PECVD in argon HCD with small impurity of propane. A small (up to 1:1000) admixture of propane at a plasma-forming gas pressure of 40 Pa weakly affects the plasma parameters, but it allows to vary the relative copper content in the DLC.

This technique seems promising for obtaining NC based on DLC, not only with an admixture of copper, but also with other metals. Smooth adjustment of the propane partial pressure and discharge voltage (ion energy) will allow to choose the necessary application modes in accordance with the sputtering coefficient of the required metal.

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