**THE POSSIBILITY OF USING CARBON NANOMATERIALS IN ALTERNATIVE ENERGY**

H.Yu. Mykhailova, M.M. Yakymchuk, I. Ye. Galstian, E. G. Len

*G. V. Kurdyumov Institute for Metal Physics of the N.A.S. of Ukraine*

*36 Academician Vernadsky Boulevard, UA-03142 Kyiv, Ukraine*

*E-mail:* [mihajlova.halina@gmail.com](mailto:Mihajlova.halina@gmail.com)

The development of industry and technology need a new class of materials on the scale required for industrial use, with minimal costs. Currently, the interest in nanostructured materials and substances in nanodispersed condition is growing. Many areas of nanotechnology are related to carbon nanomaterials and are aimed at creating new materials for various industrial needs, including materials for energy storage and converters.

But, there are a lot of problems hindering the development of alternative energy. These include high cost, complexity of operation and rapid degradation of traditional materials for thermal emission converters (TEP). TEPs of refractory metals allow to obtain a high emission current density only at high temperatures, which take place in the middle of nuclear reactors and at high-temperature stages of combustion of fossil fuels. For wide application of this type of direct energy conversion, it is necessary, with maintaining the emission of electrons from the cathodes of TEP, a significant reduction in their operating temperature to a level that could provide household stoves and small concentrators of solar radiation.

CNTs combine the properties of metals and semiconductors. Their quantum-mechanical nature can ensure the inertial motion of electrons along the CNT axis and the tunnel mechanism of their exit, which does not require large energy spending, which contributes to their use and as a source of intense autoelectron emission.

Therefore, to ensure emission at lower temperatures, carbon nanostructures (CNS) are added to the cathode metal, which act as electron emitters on the cathode surface. Controlled in this case, the structure, aspect ratio and orientation of the CNS allow to determine the optimal technological conditions for obtaining new materials for thermal and solar energy.