FIELD EMISSION PROPERTIES OF CARBON MATERIALS

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ABSTRACT

Currently a significant number of countries are introducing ban of mercury containing lamps due to ecological reasons. The result of it was intensification of research in development of eco-friendly and technologically efficient light sources. Cathode luminescent lamps, used as UV-light sources, have several advantages compared to the other solutions, the main competitive advantage being the ability to maintain high emission currents. In the project the emissive properties of the cathodes made of PAN fibers, pyrographite and CNT-thread were compared.
Current-voltage curves(CVC) were obtained for each of the type of the material of cathodes, taking into account the following factors: various cathode shapes and the different preparation processes. CVC‘s were collected in dynamic and static modes. In dynamic mode the voltage was continuously lowered in the short span of several seconds, during which oscilloscope was measuring emission current. In static mode the values weren’t collected until they stabilized, which took around 5-8 minutes for the current fluctuations not to exceed the +- 5% range after the moment voltage was adjusted. Microstructure of the studied samples before and after exposition in a vacuum camera was observed via scanning electron microscope. The degree and characteristics of material degradation were estimated according to SEM photographs.