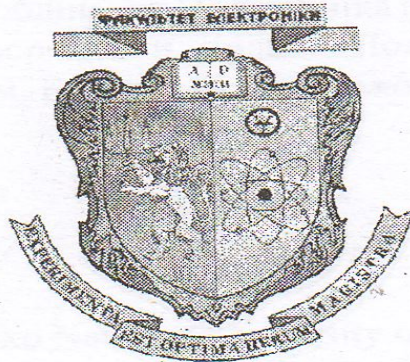# ELIT 2017
ABSTRACTS

9th Ukrainian-Polish Conference

ELECTRONICS AND INFORMATION TECHNOLOGIES

Lviv-Chynadiyevo, Ukraine, August 28-31, 2017

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
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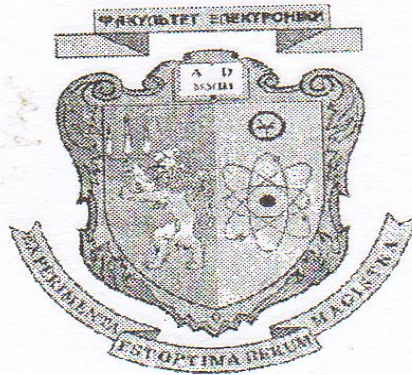
МАТЕРІАЛИ

IX-ої Українсько-польської науково-практичної конференції

ЕЛЕКТРОНІКА ТА ІНФОРМАЦІЙНІ ТЕХНОЛОГІЇ

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BOOK OF ABSTRACTS

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МІКРОПРОЦЕСОРНІ ІНФОРМАЦІЙНІ СИСТЕМИ

MICROPROCESSOR INFORMATION SYSTEMS

CYBER-PHYSICAL SYSTEM AND DATABASE FOR MICROCLIMATE MONITORING WITH USING NANOSTRUCTURED SENSOR ELEMENTS

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In the modern development of information technology the cyber-physical systems (CFS, i.e. complex platform related components for integration processes of physical and cyber worlds) are popular [1]. Effective work of CFS is possible only if the provision of high-quality primary information. This requires a fundamentally new sensors based on modern functional nanomaterials with new physical effects, the use of sensors arrays highly sensitive, accurate and stable measurement channels. This work is dedicated to the development of cyber-physical computer system using previously obtained technologically modified temperature, humidity and integrated temperature/humidity sensors based on functional ceramic nanomaterials [2,3] and database for microclimate monitoring and control.

Hardware of computer system for monitoring and control of microclimate parameters was implemented on modern element base with modular organization working in the real time and can be used to complementation of database on environmental conditions. The microcontroller PSoC contains all necessary modules and manages the work of all components. Designed intelligent microprocessor system for microclimate monitoring and control contains level of sensors (humidity, temperature sensors and integrated temperature-humidity sensors. Signals from sensors transform into an electrical signal and fed to the input of analog-to-digital converter (ADC). The including scheme provides harmonization of output signals from sensors in the region of ADC.

Software for system was created based on object-oriented language java. Such choice will provide the necessity of work of the program on any calculable machines as well as simplification of programing process, time of implementation and increase of reliability. The system consists of hierarchy of objects. The "EnvironmentalMonitoring" class is based. System software proposed interactive work regime with an operator. It's will allow distantly to set all parameters for measurements, change intervals between measurements as well as to get information about work of each of sensors in an user-friendly form. In the ordinary mode each complexes will be able a few times per days to give the query. Obtained information will act on a central terminal without operator.

So, intelligent CFS for microclimate control and monitoring using novel technologically modified nanostructured humidity- and temperature sensors was designed to monitor, collect, process, transmit, store and analyze of information on the state of the environment, forecasting their changes and development of recommendations for making decisions on the prevention of negative changes state of the environment and compliance with environmental safety.

[1] Wolf W., Cyber-physical systems. *Embedded Computing*, vol. 42(3), 2009, pp. 88-89.
[2] Klym H., Hadzaman I., Shpotyuk O., Brunner M. Integrated thick-film nanostructures based on spinel ceramics // *Nanoscale Research Letters*, vol. 9, 2014, pp. 149-1-6.