

SURFACE MORPHOLOGY OF NANOSTRUCTURED GAS SENSORS BASED ON METAL-POLYMER COMPOUNDS

D.O. Harbuz^{a,b}, A.P. Pospelov^a, M.D. Romanov^b, P.V. Mateychenko^c, A.P. Konotop^b, V.A. Gudimenko^b, G.V. Kamarchuk^b

^aNational Technical University "Kharkiv Polytechnic Institute", 2 Kyrpychov Str., Kharkiv, 61002, Ukraine

^bB. Verkin Institute for Low Temperature Physics & Engineering, 47 Nauky Ave., Kharkiv, 61103, Ukraine

^cInstitute for Single Crystals, National Academy of Sciences of the Ukraine, 60 Nauky Ave., Kharkiv, 61000, Ukraine

e-mail: Zeyxes@gmail.com

In recent years, highly sensitive gas sensors have become increasingly popular. The field of their application varied widely, from medical sensors that could detect oncological diseases by the human breath [1], to sensors that could detect the methane, without which modern mining would not be possible.

In the present study, we create and investigate conductive gas sensors based on the point-contact gas sensitivity effect. Samples are obtained by combined electrochemical deposition. The TCNQ compound was used as a sensitive material for those devices. In our case, the Yanson point contact serves as simplest gas sensor which is formed between two crystals of Cu-TCNQ. Each gas sensor is a complex multistructure and includes a several hundred point contacts. Earlier we demonstrated the wide possibilities of such sensors in studies aimed at the diagnosis and differentiation various strains of the *Helicobacter Pylori* infection [2].

The features of Cu-TCNQ compounds include the variety of morphologies of their crystals, as well as their polymorphic nature. This study was aimed to investigate the dependence between the deposition conditions and the resulting surface morphology and their correlation with electrophysical properties of gas sensors based on Cu-TCNQ compounds.

The results of our research have allowed us to clarify the influence of deposition parameters on the structure of the resulting samples. During the work, the optimal deposition parameters were investigated and an automatic laboratory deposition device was developed, which made it possible to obtain a large number of gas sensors in a short time. The data obtained bring closer the introduction of sensors of this type into widespread use.

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¹Li, W., Liu, H., Xie, D. et al. Lung Cancer Screening Based on Type-different Sensor Arrays. *Sci Rep* 7., **2017**, 1969.

²E. Kushch, N. Korenev, L. Kamarchuk. et al. On the importance of developing a new generation of breath tests for *Helicobacter pylori* detection, *J. Breath Res.*, **2015**, 9(4), 047111.