

## **Flexible transparent nanotube based coating for electronic applications**

Ahmadishina K.F., Bobrinetskiy I.I., Komarov I.A., Malovichko A.M., Petuhov V.A., Ibragimov R.A.

*National Research University of Electronic technology, Russian Federation  
(master\_kom@mail.ru)*

Transparent electrodes which most based on indium tin oxide are used in many modern devices such as displays, mobile phones etc. But one of the main problems of indium tin oxide is fragility, so flexible devices can't be based on it. One of the possible alternatives for flexible transparent conductive electrodes creation are carbon nanomaterials [1].

In this work we proposed a method of conductive flexible transparent nanotube based films creation. As a flexible transparent substrate we used polyethylene naphthalate due to its good mechanical properties and good thermal stability. To deposit nanotubes we used surfactant water solution. We investigated the dependence of structure conductivity and transmittance on the carbon nanotube layer number. We found that resistance of structures decrease to about 0,4 – 0,2 MOhm when the number of layers is about 20. The transmittance of structures is about 50 %. Also we focused on the electronic properties of bended substrates. Main investigation was the resistance dependence on cyclic bending on 90°. We found that compression of conducting layer results in 8% structure resistance change and tension results in 10% change. Besides we investigated the effect of nanotube concentration on the electronic properties of structures and found out that nanotube concentration should be about 0,02 mg/ml.

Thus we made a complex investigation of the carbon nanotube based transparent flexible coatings for electronic applications.

[1] Darren J. Lipomi, Michael Vosgueritchian, Benjamin C-K. Tee, Sondra L. Hellstrom, Jennifer A. Lee, Courtney H. Fox, and Zhenan Bao. Nature nanotechnology 2011, Volume 6, №12, pp.788 – 792.