

## **Analysis of Melanin Properties in Radio-frequency Range Based on Distribution of Relaxation Times**

P.A. Abramov, S.S. Zhukov, Z.V. Bedran, B. P. Gorshunov and K.A. Motovilov  
*Moscow Institute of Physics and Technology, Dolgoprudny, Russia*

Being a family of biodegradable materials with natural origin, melanins are widely used for development of model bioelectronic devices. However, the mechanism of their electric conductivity is still a matter of discussions. Current study is devoted to the room temperature impedance measurements of pure and copper-doped synthetic eumelanin at different values of humidity in frequency range  $0.1 - 5 \cdot 10^6$  Hz. To analyze the obtained impedance spectra, we utilize density relaxation times (DRT) methodology. The performed analysis demonstrates an absence of significant difference in relaxation times in the studied materials. At the lowest frequencies, the doped material has about 30 times lower conductance than pure material. Possible origins of the observed phenomena are discussed in terms of copper ions activity as complexing agent for water molecules and semiquinone groups of melanin.