

# **A FORMATION OF THE MULTIFUNCTIONAL METAL-POLYMER COMPOSITE WITH ANTISEPTIC, ANESTHETIC AND BACTERICIDAL PROPERTIES BY GREEN TECHNOLOGIES**

Said-Galiev E.E.<sup>a \*</sup>, Rubina M.S.<sup>a</sup>, Vasil'kov A.Yu.<sup>a</sup>, Naumkin A.V.<sup>a</sup>, Khokhlov A.R.<sup>a</sup>,  
E.V. Shtykova K.A.<sup>b</sup>, Abd-Elsalam K.A.<sup>c</sup>

<sup>a</sup>Nesmeyanov Institute of Organoelement Compounds, Russian Academy of Sciences,  
Vavilova St., 28, Moscow, 119991 Russia

<sup>b</sup>Shubnikov Institute of Crystallography, Russian Academy of Sciences, Leninskii pr. 59, Moscow,  
119333 Russia

<sup>c</sup>Unit of Excellence in Nano-Molecular Plant Pathology Research Center – Plant Pathology Research  
Institute, 9 Gamaa St., 12619 Giza, Egypt

\*E-mail: [ernest@ineos.ac.ru](mailto:ernest@ineos.ac.ru)

The technique has been developed and multifunctional Ag-metal-polymer composite on the basis of the commercial medical sponge "Collahit-G" with antiseptic, anesthetic and bactericidal properties has been obtained. This is achieved by immobilization of ibuprofen and Ag-nanoparticles in the composite with a help of two green technology combination: the fluid one in supercritical carbon dioxide and metal-vapor synthesis. The composites obtained were investigated by XFA, TEM and XPS. A drug-release process and its mechanism have been studied within the framework of the Ritger-Peppas model. It was found that ibuprofen content in the sponge reaches 51 % from its weight. The silver particles have valence state  $\text{Ag}^0$ , the average linear size of Ag- particles is  $6 \pm 1$  nm. Duration of ibuprofen escape from initial sponge in the phosphate buffer with pH =7.4 is 3 hours. Diffusion obeys to Fick's law. A presence of Ag-clusters in the sponge does not change principally the diffusion mechanism.