

Nanocomposite Metal Material: Study of Antimicrobial and Catalytic Properties

Authors : Roman J. Jedrzejczyk, Damian K. Chlebda, Anna Dziedzicka, Rafal Wazny, Agnieszka Domka, Maciej Sitarz, Przemyslaw J. Jodlowski

Abstract : The aim of this study was to obtain antimicrobial material based on thin zirconium dioxide coatings on structured reactors doped with metal nanoparticles using the sonochemical sol-gel method. As a result, dense, uniform zirconium dioxide films were obtained on the kanthal sheets which can be used as support materials in antimicrobial converters with sophisticated shapes. The material was characterised by physicochemical methods, such as AFM, SEM, EDX, XRF, XRD, XPS and in situ Raman and DRIFT spectroscopy. In terms of antimicrobial activity, the material was tested by ATP/AMP method using model microbes isolated from the real systems. The results show that the material can be potentially used in the market as a good candidate for active package and as active bulkheads of climatic systems. The mechanical tests showed that the developed method is an efficient way to obtain durable converters with high antimicrobial activity against fungi and bacteria.

Keywords : antimicrobial properties, kanthal steel, nanocomposite, zirconium oxide

Conference Title : ICNNAM 2018 : International Conference on Nanoscience, Nanotechnology and Advanced Materials

Conference Location : Venice, Italy

Conference Dates : August 13-14, 2018