

Bioactive antimicrobial SiO₂-Ag modified wound-dressings

I.A. Neacsu^{1,*}, I. C. Croitorescu², V.L. Ene¹, R. Trusca², B.S. Vasile¹, A.M. Holban³, A.C. Birca¹, E. Andronescu¹

¹ University Politehnica of Bucharest, Faculty of Applied Chemistry and Materials Science, Gh. Polizu Street No.1, 011061, Bucharest, Romania

² University Politehnica of Bucharest, Faculty of Engineering in Foreign Languages, Splaiul Independentei Street No. 313, 060042, Bucharest, Romania

³ University of Bucharest, Faculty of Biology, Aleea Portocalelor, Bucharest, Romania

* Correspondence: neacsu.a.ionela@gmail.com; Scopus ID: 57197805503

Skin is the largest organ of the human body and acts as a protective barrier against pathogens and physical damage, having also an important role in preventing excessive water loss from the body. The increased number of cases with microbial infections arising from skin conditions, such as burns, has begun to affect the quality of life of patients. The appearance on the market of innovative dressings resulted in optimum healing by maintaining the moist environment, absorbing a significant amount of exudate, stimulating the regeneration process and providing an effective antimicrobial character [1-2].

On the basis of the above, the present work proposes the development of biocomposite dressings that provide a porous structure and an accentuated reepithelization process through the presence of collagen and a therapeutic, antimicrobial action through the presence of silver loaded mesoporous silica particles.

Biocomposite dressings have been characterized by several methods. Thus, Scanning Electron Microscopy (SEM) revealed the porous structure of collagen and the presence of round shaped SiO₂ particles, with diameter around 200-300 nm, homogeneously dispersed in the polymer matrix. Transmission Electron Microscopy (TEM) confirmed the triangular and polyhedral shape of Ag nanoparticles as well as their adhesion to the silica surface. Fourier Transform Infrared Spectroscopy (FTIR) showed the characteristic bands of collagen functional groups and Si-O-Si. Antimicrobial tests have confirmed the antimicrobial efficacy of the obtained wound dressings.

Keywords: Biocomposite dressings; Silica nanoparticles; Silver nanoparticles.

Funding

The XRD, FT-IR and SEM analyses/images obtained on the samples were possible due to EU-funding project POSCCE-A2-O2.2.1-2013-1/ Priority Axe 2, Project No. 638/12.03.2014, ID 1970, SMIS-CSNR code 48652.

Acknowledgments



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Conflicts of Interest

The authors declare no conflict of interest.

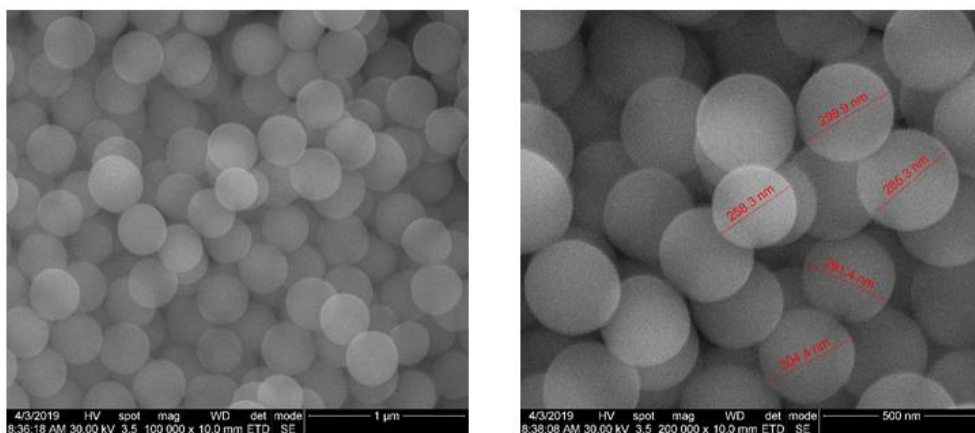


Figure 1. SEM images for SiO₂ powder.

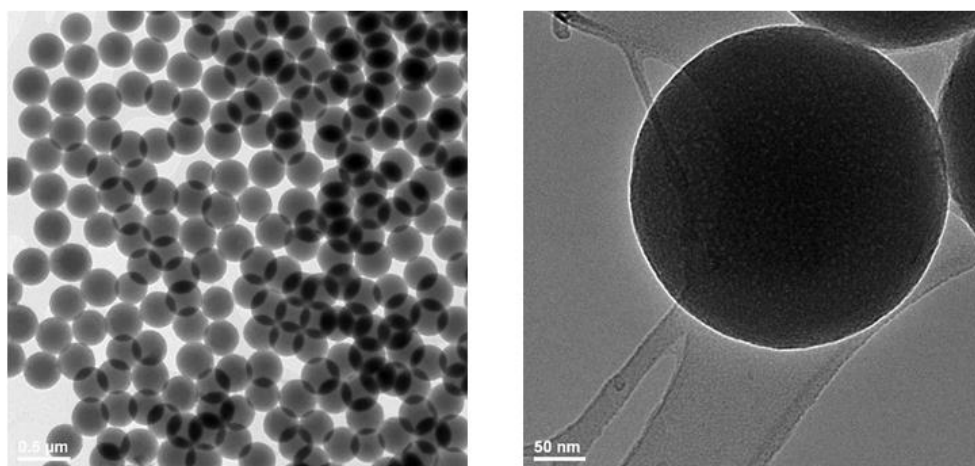


Figure 2. TEM images for SiO₂ powder.

References

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