

Preparation and antibacterial properties of hybrid-zirconia films with silver nanoparticles

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The antimicrobial effect of incorporating silver nanoparticles (AgNps) into zirconia matrix-polyether glycol was studied. AgNps of 4-6 nm in size were synthesized using the inverse micelles method, and different doses of metallic nanoparticles were incorporated into zirconia-polyether glycol mixtures during the ageing procedure. Atomic force microscopy (AFM) of the modified hybrid film showed a homogenous distribution of 20-80 nm diameter AgNps, indicating agglomeration of these structures during film modification; such agglomerations were greater when increasing the dosage of the colloidal system. The AgNps-hybrid films showed higher antimicrobial activity against Gram-positive bacteria than for Gram-negative bacteria. Hybrid films prepared with dioctyl sodium sulfosuccinate (AOT) stabilized AgNps presented enhanced antibacterial activity compared to that obtained through the addition of a high AgNO₃ concentration (0.3 wt%). © 2012 Elsevier B.V. All rights reserved.