

Title (en)
ANTIBACTERIAL LAYER ACTIVE AGAINST PATHOGENIC BACTERIA, PARTICULARLY AGAINST THE MRSA BACTERIAL STRAIN, AND THE METHOD OF ITS PRODUCTION

Title (de)
GEGEN PATHOGENE BAKTERIEN AKTIVE, ANTIBAKTERIELLE SCHICHT, INSBESONDERE GEGEN DEN MRSA-BAKTERIENSTAMM, UND VERFAHREN ZU DEREN HERSTELLUNG

Title (fr)
COUCHE ANTIBACTÉRIENNE ACTIVE CONTRE DES BACTÉRIES PATHOGÈNES, EN PARTICULIER CONTRE LA SOUCHE BACTÉRIENNE MRSA, ET SON PROCÉDÉ DE PRODUCTION

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Abstract (en)
[origin: WO2013174356A1] The invention concerns an antibacterial layer active against pathogenic bacteria, particularly against the MRSA bacterial strain, composed of the hybrid polymer of 3-(trialkoxysilyl)propyl methacrylate and titanium(IV) alkoxide, with an addition of soluble silver, copper and zinc salts, and possibly also with an addition of titanium dioxide nanoparticles. The hybrid polymer may also include an addition of soluble chromium(III) and/or vanadium salts, or up to 90 mol.% of 3-(trialkoxysilyl)propyl methacrylate may be replaced with an equimolar mixture of methyl methacrylate and tetraalkoxysilane. Furthermore, the invention concerns the production of an antibacterial layer active against pathogenic bacteria, particularly against the MRSA bacterial strain, by applying the sol, prepared using a sol-gel method, to the substrate surface, and by subsequent polymerization of the layer. The sol is made of 3-(trialkoxysilyl)propyl methacrylate, titanium(IV) alkoxide, soluble silver, copper and zinc salts, a radical catalyst of polymerization, alcohol as the solvent, water and nitric acid as the catalyst of polycondensation of the inorganic part of the hybrid grid so that the molar ratio of 3-(trialkoxysilyl)propyl methacrylate and titanium(IV) alkoxide in the reaction mixture is 95:5 to 50:50; the content of silver, copper and zinc compounds (converted to metals in dry mass) was Ag 0.1 to 5 %w, Cu 0.1 to 10 %w, and Zn 0.1 to 5 %w; content of the radical catalyst of polymerization was 0.2 to 10 %w per dry mass weight, and the molar ratio of water content $k = [H_2O]/[alkylalkoxysilane + titanium(IV) alkoxide]$ was in the range from 1.6 to 2.8, while upon application and evaporation of the solvent, the sol is polymerized using heat at 80 °C to 200 °C for 30 min to 6 hours or by photoinitiated polymerization for 1 s to 3 hours.

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