

## MATERIALS BASED ON SILVER NANOPARTICLES WITH HIGH ANTIMICROBIAL ACTIVITY. METHOD OF PREPARATION

### DESCRIPTION OF THE TECHNOLOGY

This invention, which is the subject of the patent presented jointly by researchers from the Universidade Federal de São Carlos (UFSCar), the Universitat Jaume I de Castelló (UJI) and Universidade Estadual de Campinas (UNICAMP) addresses the formation of silver nanoparticles from a silver salt (Figure 1), where a reduction process generates a composite material formed by this silver salt with segregation of nanoparticles of metallic silver on its surface. This segregation is achieved by irradiating the precursor material with a high-energy electron beam (generated in an electron microscope) or by irradiation with a femtosecond laser (Figure 2).

In this way, the antimicrobial activity of the treated salt improves remarkably with respect to the non-irradiated salt. The precursor silver salt is an  $\alpha$ -silver tungstate with a cubic morphology synthesised by a precipitation reaction modified by a surfactant and is the one that offers the greatest antimicrobial activity.

### SECTORS FOR COMMERCIAL APPLICATION

Potential industrial applications for materials that require antimicrobial protection, such as:

- Hospital material.
- Dental material.
- Different articles with antimicrobial activity.

### TECHNICAL ADVANTAGES AND COMMERCIAL BENEFITS

- The material developed displays a bactericidal activity that is higher than that of other materials with an equivalent function currently available on the market.
- The material is obtained using techniques which do not generate any waste that is toxic or harmful to the environment.

### STAGE OF DEVELOPMENT OF THE TECHNOLOGY

Initial tests conducted at the laboratory scale.

### INDUSTRIAL AND INTELLECTUAL PROPERTY RIGHTS

The holders of such rights are: UFSCar, UJI and UNICAMP. This invention is protected by means of the Brazilian patent with reference BR 10 2019 015473 0 and application date 26/07/2019.

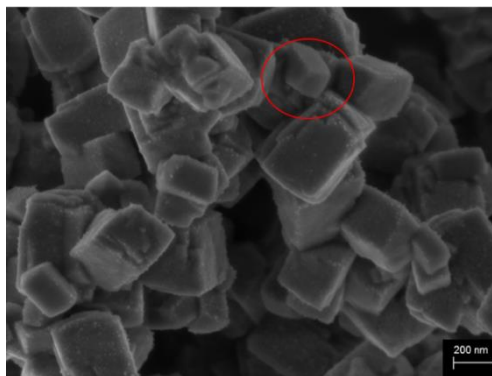


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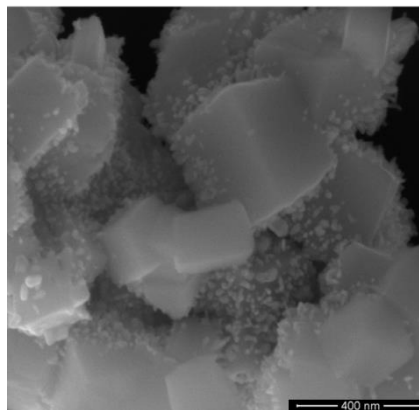
### COLLABORATION SOUGHT

Development and adaptation of the technology to particular applications through specific agreements. Exploration phase in companies in Brazil by the Universidade Federal de São Carlos.

### RELATED IMAGES



**Figura 1:** Micrografía obtenida por microscopia electrònica de barrido de  $\alpha$ -wolframato de plata con morfología cúbica



**Figura 2:** Micrografía obtenida por microscopia electrònica de barrido de una muestra compuesta de Ag/ $\alpha$ -Ag<sub>2</sub>WO<sub>4</sub> irradiada.

### CONTACT DETAILS

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