

Supplementary Materials

Solid State Photoreduction of Silver on Mesoporous Silica to Enhance Antifungal Activity

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Content:

- UV-Vis spectra of SYLOID AL1FP and AgNO ₃ .	Page 1
- SEM images of solid powder samples.	Page 1
- Size distribution histogram of silver nanoparticles on samples	Page 1
- Zoom of the IR spectra of samples in the region of the Si-O stretching	Page 2
- XRD spectra of samples	Page 2
- Photographs of silicone discs loaded with AgNO ₃ and samples	Page 2
- SEM images of section of silicone discs	Page 3

UV-Vis reflectance spectrum of SYLOID AL1FP

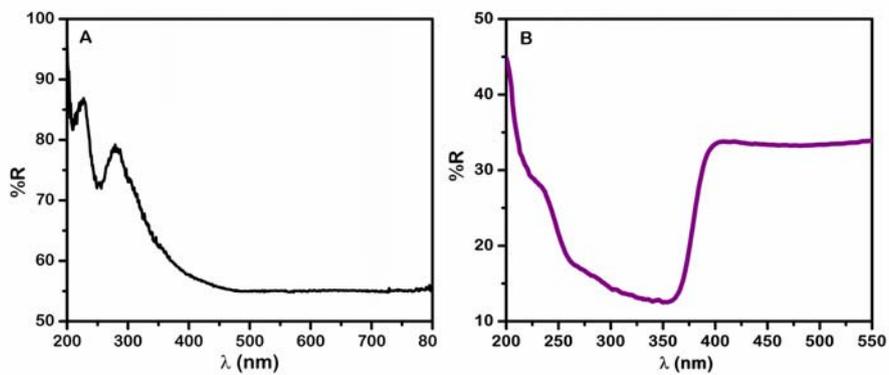


Figure S1: UV-Vis reflectance spectrum of SYLOID AL1FP (A) and AgNO₃ powder (B).

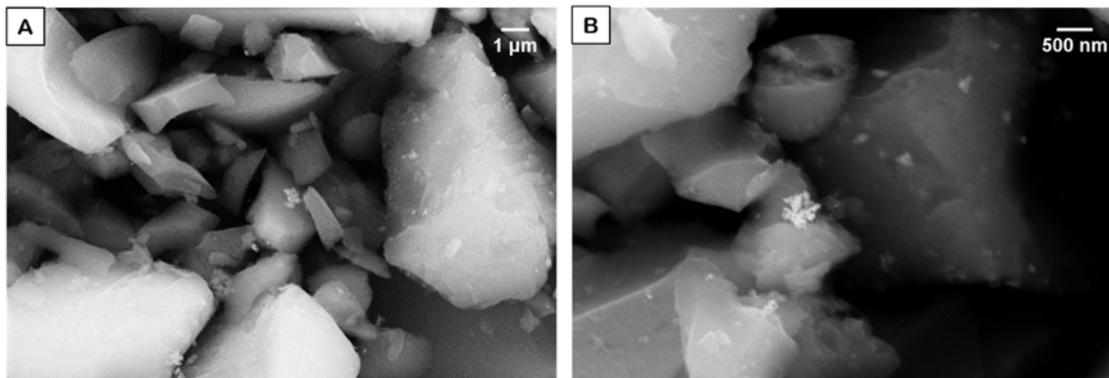


Figure S2: SEM images of SiO₂-Ag (A) and SiO₂-Ag-Irr (B).

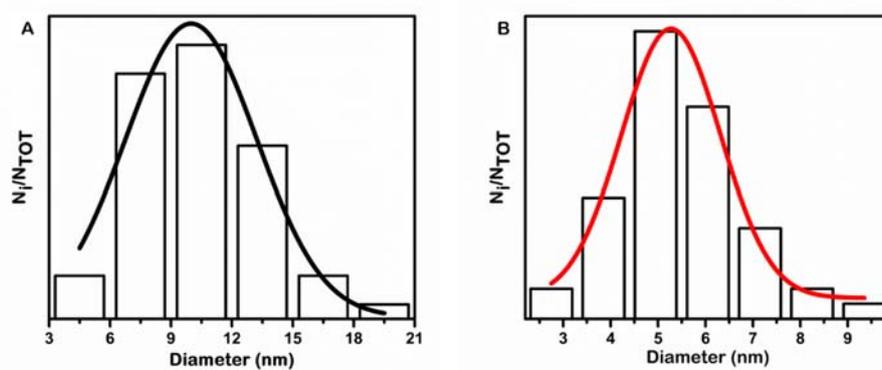


Figure S3: Size distribution of SiO₂-Ag (left) and SiO₂-Ag-Irr (right).

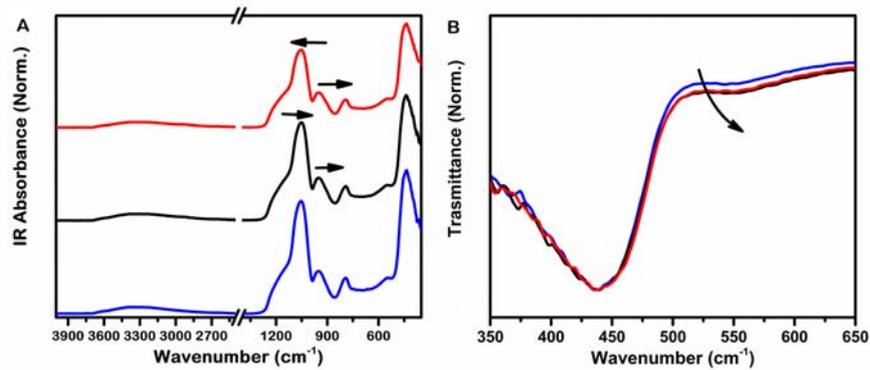


Figure S4: (A) ATR-IR spectra of SiO₂ (blue line), SiO₂-Ag (black line), SiO₂-Ag-Irr (red line). (B) Normalized ATR-IR spectra at 436 cm⁻¹.

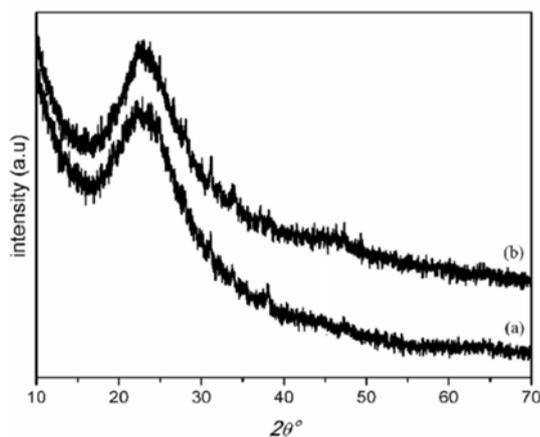


Figure S5: XRD spectra of SiO₂-Ag (a) and SiO₂-Ag-Irr (b).

Table S1: Composite concentrations used for MIC determination

Sample response	Tested composite concentration for MIC determination (µg/mL)											
	17.28	8.64	4.32	2.16	1.08	0.54	0.26	0.13	0.06	0.03	0.015	0.0075
SiO ₂ -Ag	X	X	X	X	X	X	X	V	V	V	V	V
SiO ₂ -Ag-Irr	X	X	X	X	X	X	X	X	V	V	V	V

Preparation and characterization of silicone-composites



Figure S6: Photograph of functionalized silicone discs.



Figure S7: SEM images of functionalized silicone section with AgNO₃ (A); SiO₂-Ag (B); SiO₂-Ag-Irr (C).

Antifungal and antibiofilm tests

To prepare the inoculum, *Aspergillus niger* was grown in an SAB (Sabouraud Dextrose Agar) medium with chloramphenicol on petri dishes for 72 hours at 37°C. The conidiospores formed on the surface of the fungus were collected and transferred into a sterile centrifuge tube with 5 mL of physiological solution. After sedimentation (5 minutes), the pellet was suspended in RPMI-1640, counted by hemocytometer and diluted in RPMI-1640 and MOPS to obtain a concentration of 5×10^4 CFU/mL. A sterile microplate was filled with the inoculum of *Aspergillus niger* and SiO₂-Ag and SiO₂-Ag-Irr dispersed in RPMI-1640 and MOPS. The first line of the plate was used to control the growth of the fungus and filled it with 200 μL of inoculum. The second line of the plate was utilized to control medium sterility (200 μL). The other lines were filled with 100 μL of inoculum and 100 μL of samples (irradiated and non-irradiated) diluted in saline solution at 1:2 scalar dilutions. The microplate was incubated at 37°C for 24 hours. After incubation, the plate was observed to determine the minimum concentration of silver nanoparticles able to inhibit the growth of *Aspergillus niger*. The Minimum Inhibitory Concentration (MIC) is established as the highest chemical agent dilution capable of inhibiting the fungal growth. Each test was conducted in triplicate.

Silver nanoparticles with a concentration of one half, one fifth and equal to the MIC were used for the analysis and 100 μL of a suspension of *Aspergillus niger* in SAB and 2% sucrose were included in the microplate. After 48 hours of incubation at 37°C, supernatants were removed by aspiration with syringe. The microplate wells were washed with 0.2 mL of PBS (phosphate buffered saline, pH=7.4). The biofilm obtained was stained with 50 μL of 0.4% of Crystal Violet. After 15 minutes, the excess staining was washed two times with 0.2 mL of distilled water and 100 μL of ethanol was added. After 30 minutes, the measurement of biofilm mass was carried out. Absorbance spectra at 570 nm were registered to observe the antifungal activity of the silver nanoparticles.

The kinetics of biofilm growth were also analyzed for silicone functionalized with AgNO₃, SiO₂-Ag and SiO₂-Irr. *A. niger* was put in contact with the silicone discs containing the powder for 60 days

and, at defined time intervals (0, 7, 14, 28, 60, days), the biofilm growth was analyzed with the same procedure described above.