SILVER NANOCOMPOSITES FOR ANTIBACTERIAL TILE

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A most prominent nanoproduct is nanosilver. At nanoscale, silver exhibits remarkably unusual physical, chemical and biological properties. Due to its strong antibacterial activity, nanosilver coatings are used on various textiles but as well as coatings on certain implants. Further, nanosilver is used for treatment of wounds and burns and marketed as a sanitary ware, water disinfectant and room spray.

At this research, metallic silver was generated by ultraviolet radiation with 5% PVP as a surfactant from $AgNO_3$. Sliver nanoparticles were precipitated in deionized water and sulfuric acid (2M). Also, silver was doped on micro powder of Nepheline and micro/nanopowder of TiO_2, SiO_2 in both of environments. All samples were produced 30 litters homogeny suspension in stank industrially. The relationships between the antibacterial activity of powders and the fabrication conditions were investigated by X-ray diffraction, SEM and UV-visible spectrophotometer. Opposite of other papers, composites TiO_2 were the worst matrix, because TiO_2 was absorbed energy of UV radiation that were never perfected precipitation. Beside, antibacterial activity was very increase in acidic environment.

After generated silver composites, they were coated on surfaces of raw glaze with spray. All kinds of tiles (floor, wall, opaque, luster etc) were cooked. Then, they were compared in basic and important tile factors (for examples: autoclave, corrosion and erosion resistant) after stabilized of tile conditions, they were compared them in antibacterial activity.

References:

[1] X. Chen, H.J. Schluesener, Toxicology Letters, **176** (2008) 1–12.

[2] P. Davide Cozzoli et al., JACS, **126** (2004), 3868-3879.

Figures:

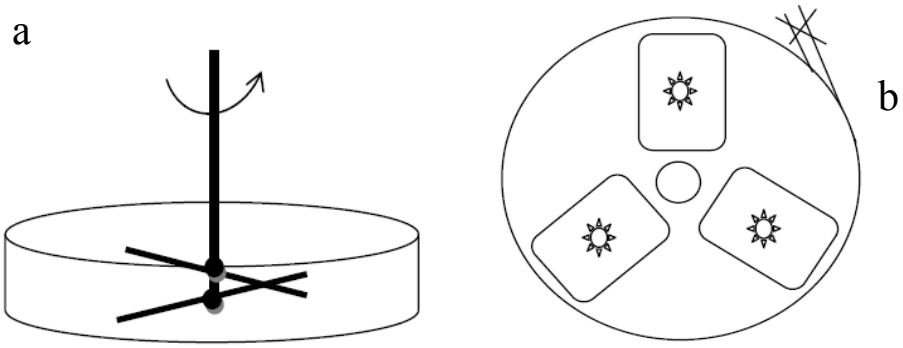

Figure 1. Schematic of used stank for production of nanosilver by UV. A) Under of stank with 2 wings. B) Head of stank with 3 lamps in projector (every ones: 250 v) and exit of production.

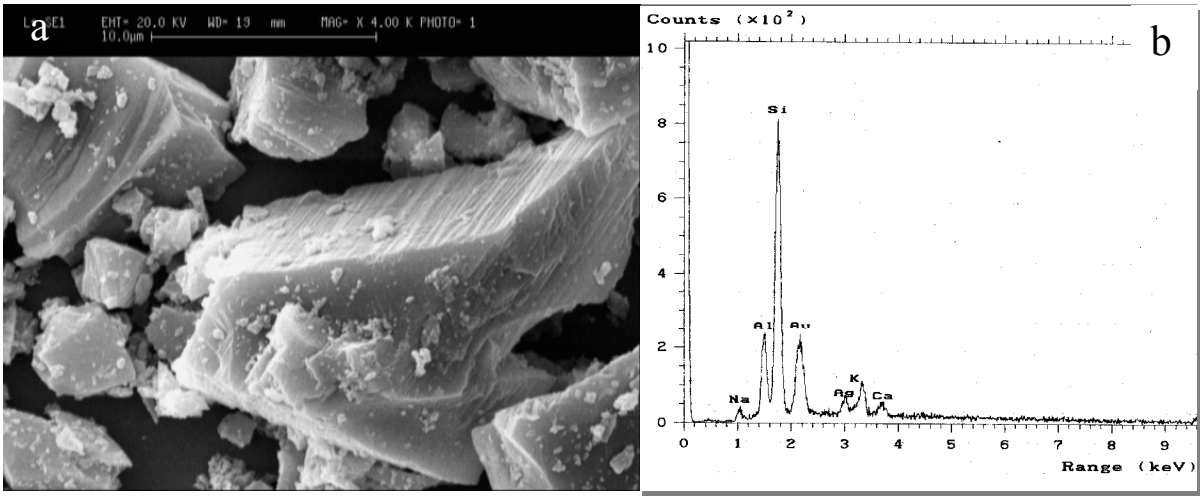

Figure 2. Nepheline nanocomposites were the best in antibacterial activity and tile productions. a) SEM micrograph of Nepheline in water, shows streaky surface that increases nucleation of reactions. b) EDX analysis estimates production of silver.

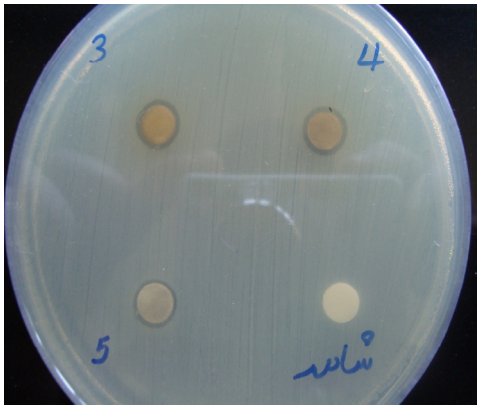

Figure 3. Antibacterial activity of nanocomposites on E.coli bacteria.

(3: Pure silver. 4: Doped on Nepheline. 5: Doped on micro-SiO_2. the other is control)