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MAGNETIC NANOGRANULAR COMPOSITE MATERIALS with APPLICATIONS IN MALIGNANT TUMORS DIAGNOSTIC, acronym: NANOMAGMED

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The objective of is to obtain a novel nanogranular composite magnetic material conditioned for malignant tumor diagnostic investigation by modifying the chemical nature of the magnetic material.
For *in vivo* biomedical applications the magnetic nanoparticles must be made of nontoxic and nonimmunogenic materials and in sufficiently small particles to remain in the blood stream after injection and to pass through the tissular capillary systems, avoiding vascular embolism, and they need to be highly magnetic so that their movement in the blood stream be controlled by a magnetic field, and immobilized on the target tissue.
The synthesis methods used were the precipitation in solution, co-precipitation, hydrolysis, thermal decomposition of organo-metallic or organo-silicic compounds,<the polyol>, and the reducing method in nonpolar solvents.

The magnetic characteristics of prepared nanoparticles: cobalt nanoparticles, cobalt-nickel nanoparticles and magnetite nanoparticles

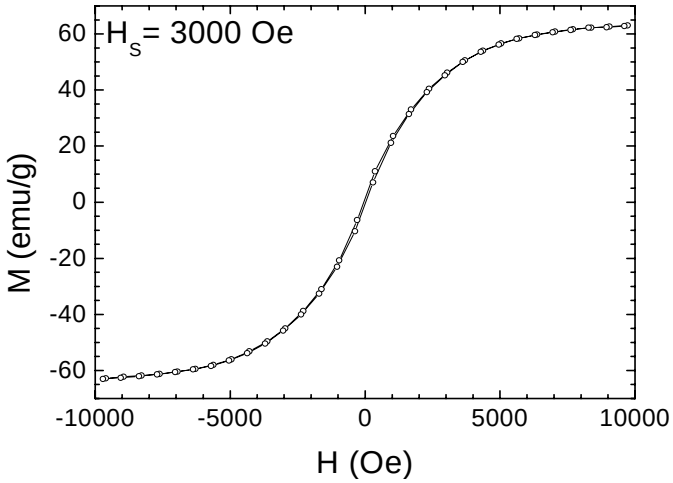

Figure 1: Hysteresis loop of NiCo nanoparticles at room temperature

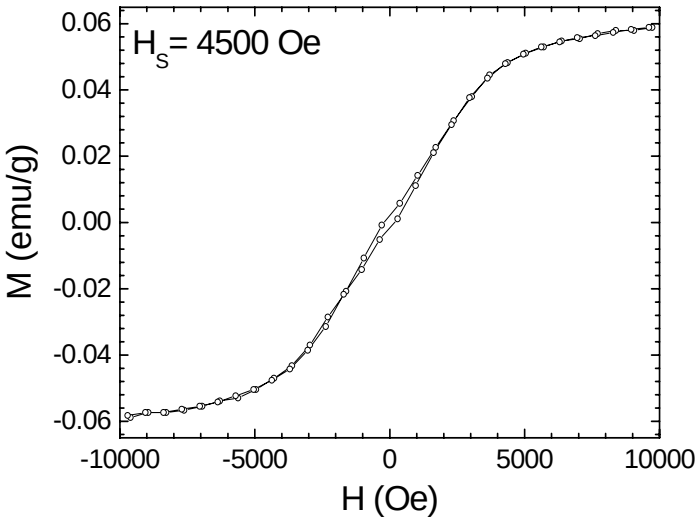

Figure 2 Hysteresis loop of Co nanoparticles at room temperature

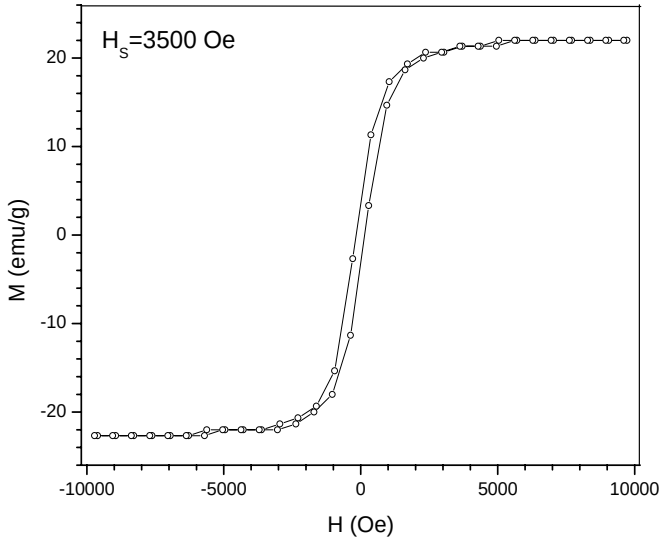

Fig. 3.Hysteresis loop of iron oxide particles, measured at room temperature

The nanogranulated magnetic particles obtained will be tested in vitro, evaluating the cytotoxic and genotoxic effect on cell cultures and in vivo (on animal model) by pharmacodinamical, pharmacocinetical and pharmacotoxicological tests.

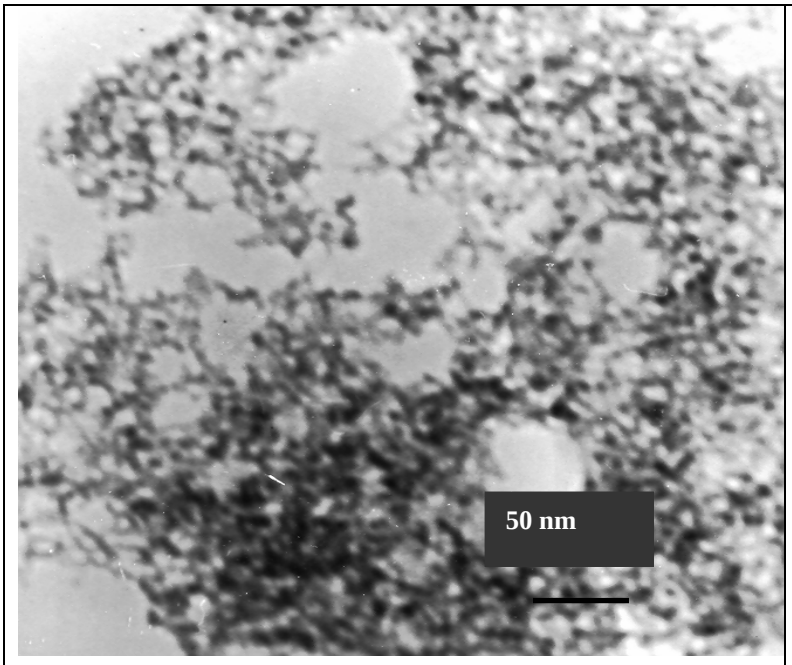

Fig. 4 TEM image of sample NiCo nanoparticles, the average size of 8-10 nm

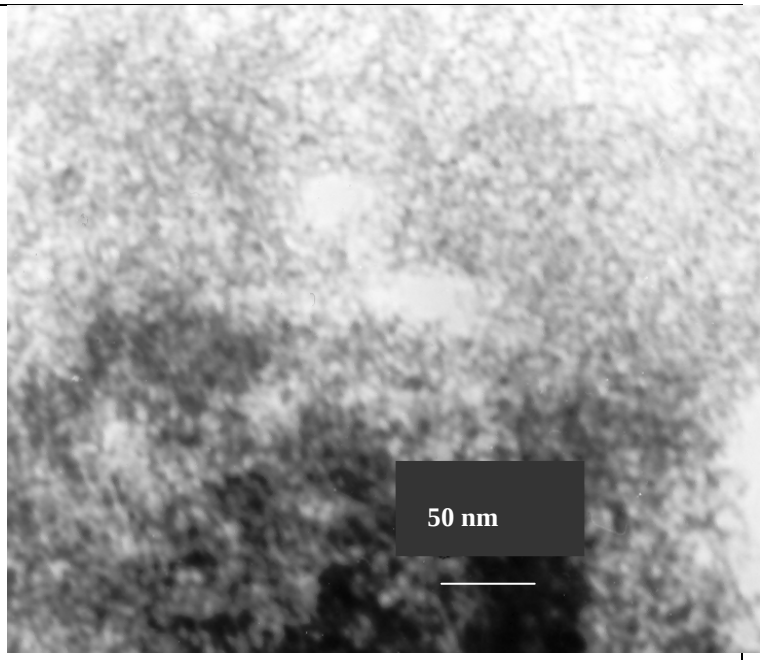

Fig. 5 TEM image of Co nanoparticles, the average size of 5-8 nm

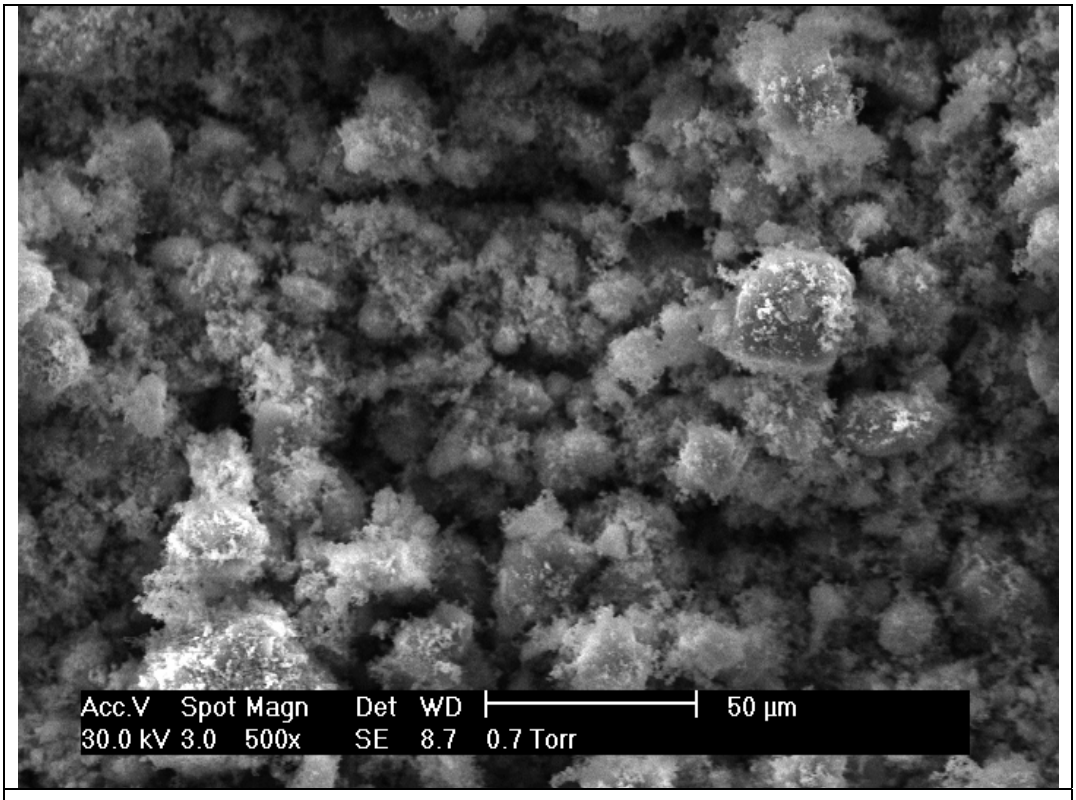

Fig. 6 SEM image of Fe_3O_4 particles sample, the average sizes of 100-300 nm

MULTIFUNCTIONAL ADVANCED MATERIALS DOPED WITH SILVER NANOPARTICLES MODELS OF BACTERICIDAL PRODUCTS

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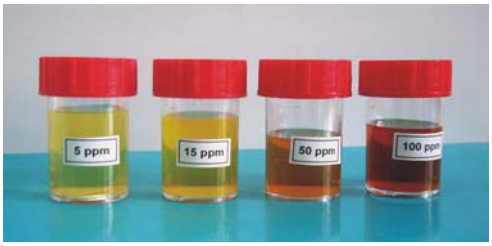
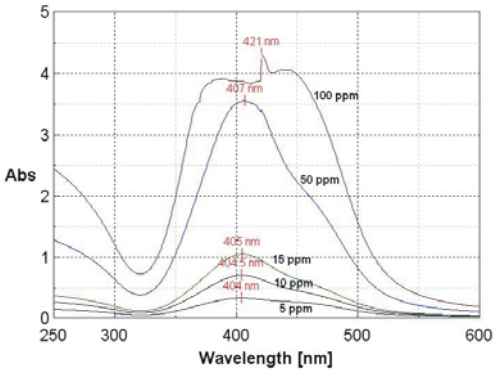
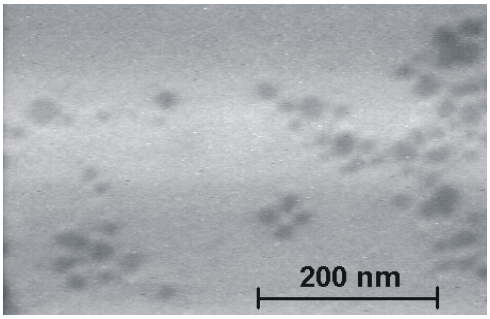
COLLOIDAL SILVER SOLUTIONS OBTAINED BY CHEMICAL WAY



Characteristics:
- Ag concentration: 5…100 ppm
- Ag nanoparticle size: max. 20 nm
- antimicrobial/antifungal properties with a broad spectrum



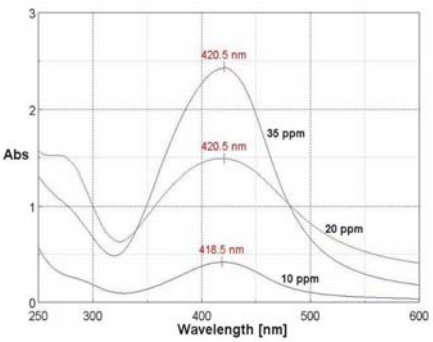
UV-VIS spectra



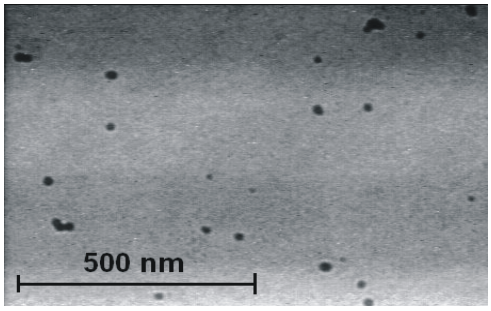
TEM image

COLLOIDAL SILVER SOLUTIONS OBTAINED BY ELECTROCHEMICAL WAY

Characteristics:- Ag concentration: 5…35 ppm
- Ag nanoparticle size: max. 20 nm
- antibacterial spectrum: S. aureus, P. aeruginosa, E. Coli, Acinetobacter
- antifungal spectrum: Aspergillus (niger, fumigatus, flavus versicolor, terreus), Paecilomyces varioti, Trichoderma viride, Scopulariopsis brevicaulis, Penicillium glaucum, Penicilium citrinum, Aureobasidium pullulans, Strachybotris atra



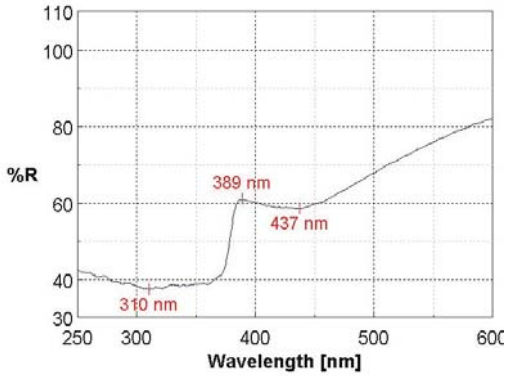
Absorbance in UV-VIS



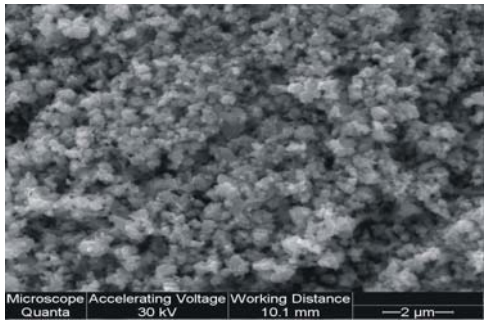
TEM image

SILVER NANOPARTICLES DEPOSITED ON THE POWDER SUPPORTS

Characteristics:
- Ag content: 50 ppm … 30 %
- d_{FSSS} = max. 500 nm
- antimicrobial/antifungal composite powders with a broad spectrum: S. aureus, P. Aeruginosa, E. coli, Acinetobacter / Aspergillus, Paecilomyces varioti, Trichoderma viride, Scopulariopsis brevicaulis, Penicillium glaucum, Aureobasidium pullulans



Reflectance in UV-VIS of the nano Ag/ZnO composite powders



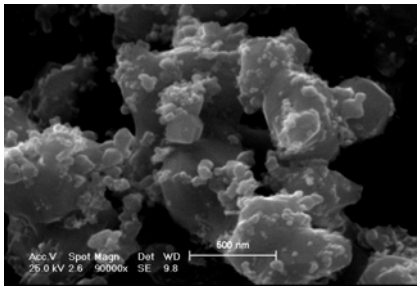
SEM micrography of the nanoAg/ZnO composite powders

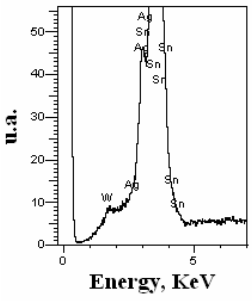
APPLICATION FIELD: drugs, cosmetics and consumer goods
ECONOMICAL IMPACT: new products with bactericidal properties
ENVIRONMENTAL IMPACT: new ecological products

MODELS OF COMPOSITE POWDERS FOR ELECTRICAL ENGINEERING

SILVER NANOPARTICLES DEPOSITED ON THE METAL OXIDE POWDER SUPPORTS

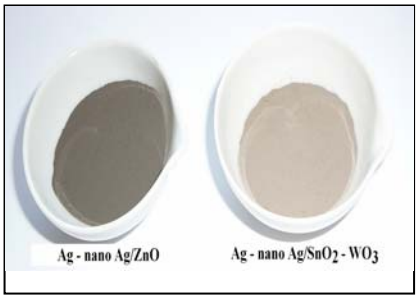
Characteristics:
- Ag nanoparticles content: 25 – 50 %
- d_{FSSS} = max. 0,5 μm



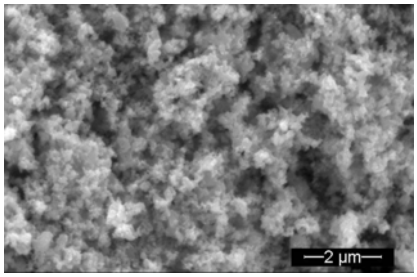


SEM of the nanoAg/SnO_2–WO_3 composite powders

POWDER MIXTURES OF Ag-nanoAg/MeO TYPE FOR ELECTRICAL CONTACTS



Characteristics:
- MeO content: 5…12 wt. %
- d_{FSSS} = max. 1.3 μm
- high degree of finesses and dispersion
- improved sinterability



SEM micrography of the Ag-nanoAg/SnO_2–WO_3