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V.Bakul Institute for Superhard Materials National Academy of Sciences of Ukraine

Ultra clean concentrated Nano Metals musters-butches in custom carrier liquids

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State of the art

Nano Particle Synthesis and Encapsulation in Liquid Media

- Nanometals dispersions in liquids mainly produced by **multi-cycles chemical (wet) processes** with bi-products and chemical wastes
- To clean nanodispersions from bi-products and chemical wastes **additional technologies shall be applied**
- The **productive scale and nanodispersion prices still are not competitive with toxic chemical modifiers**

World Demand for Nano Silver Additives in 2010

By sectors of application



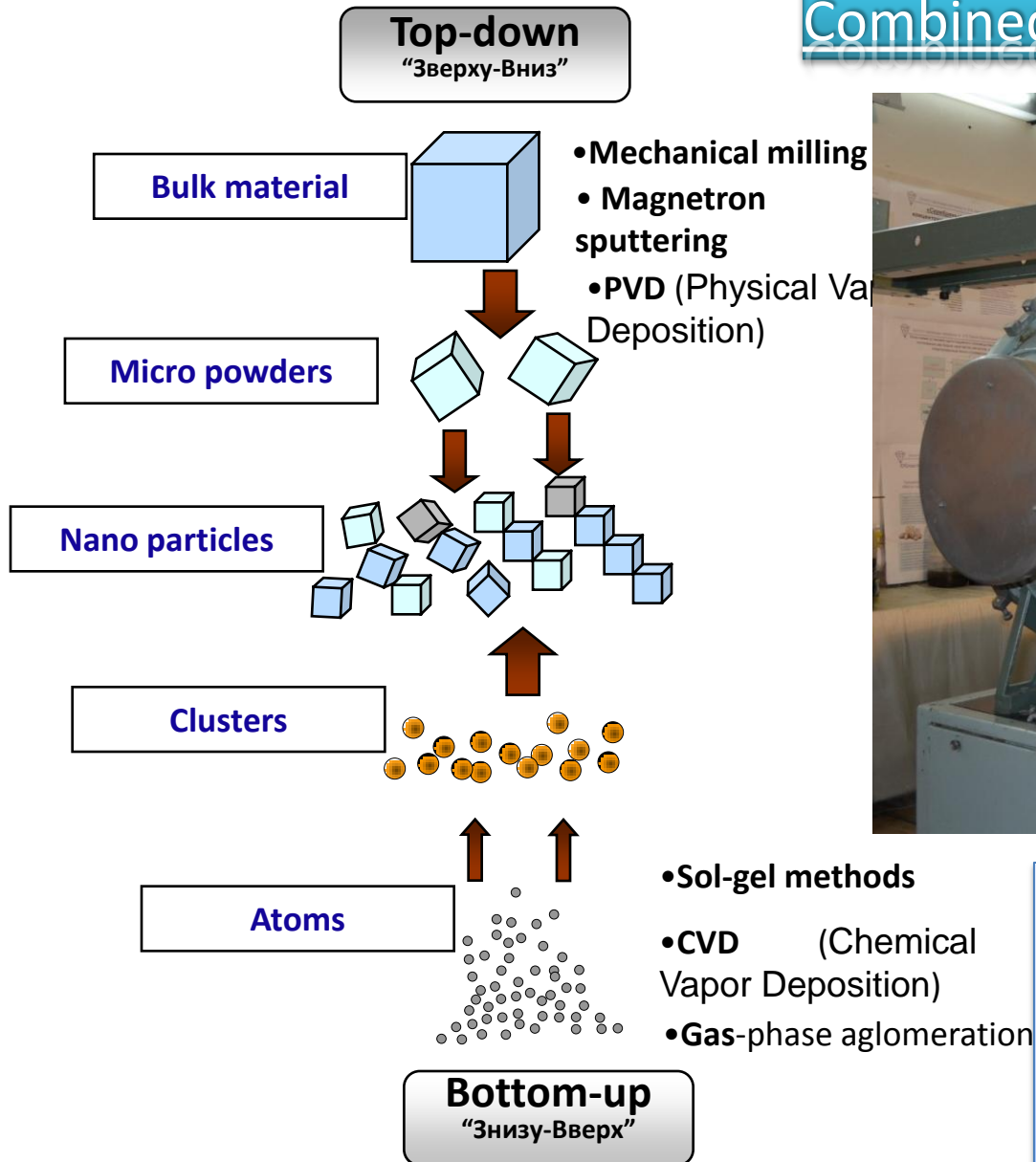
According to data from Silver Institute
Prep.GFMS Ltd,

Main Problems of Nanometals Applications:

- To add Nano metals to the end products their **dissolutions in various liquids** requires
- The **size of Nano particles shall be controllable** to create the stable homogenous solutions
- The **productivity** of Nano metals dispersions manufacturing **shall be in industrial scale**
- Nano dispersions shall be **biocompatible and eco-friendly**

Methods of Metal Nano Particles Synthesis

Combined Dry-Wet method



Nano Metal Dispersions Produced by the Patented LIPS Technology Via One-Step Productive Implantation of Sputtered Nano Particles to Carrier Liquids in Vacuum

Ultra clean concentrated nano Silver dispersion in food glycerin



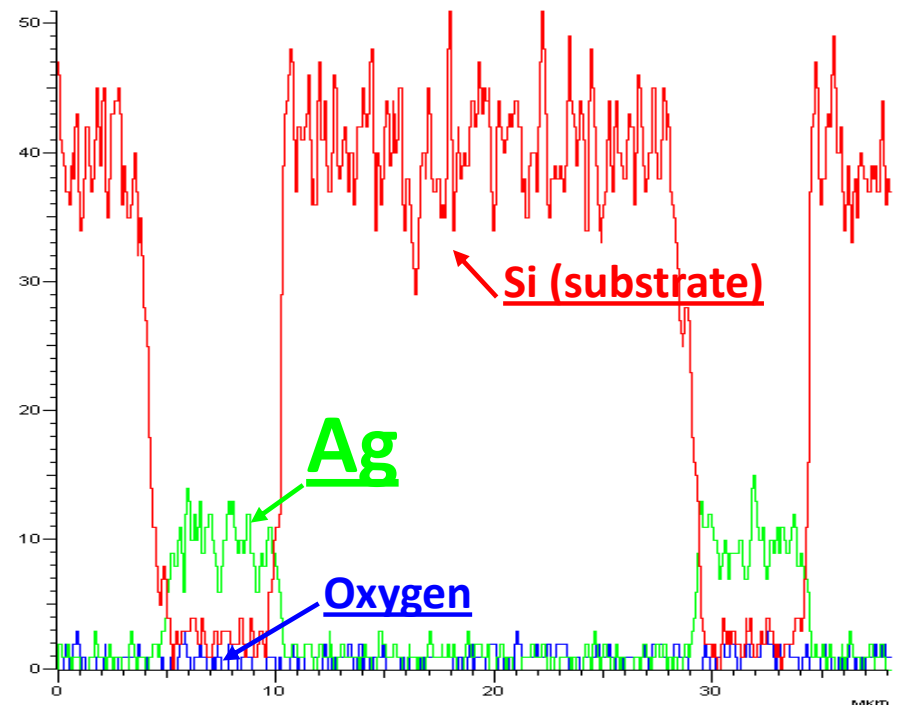
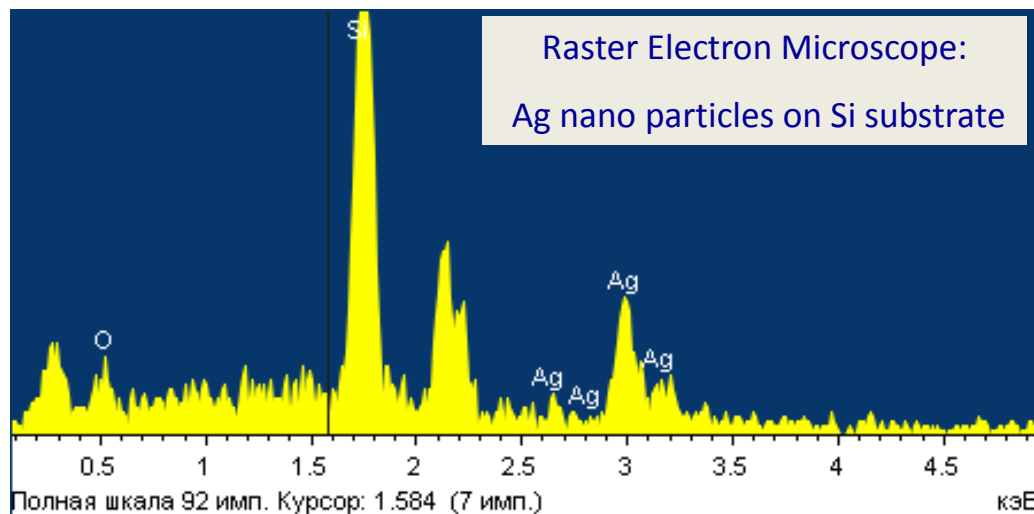
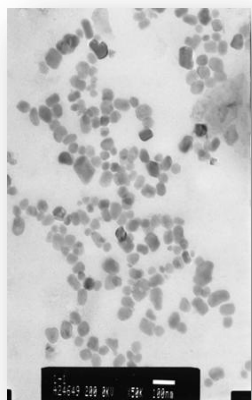
"Silver Shield-1000"™

Product Form: Nano Silver particles implanted to extra clean Food Glycerin – no trace of any bi-products or wastes

Colour: Transparent Gray

Concentration not less: >100 mg/L

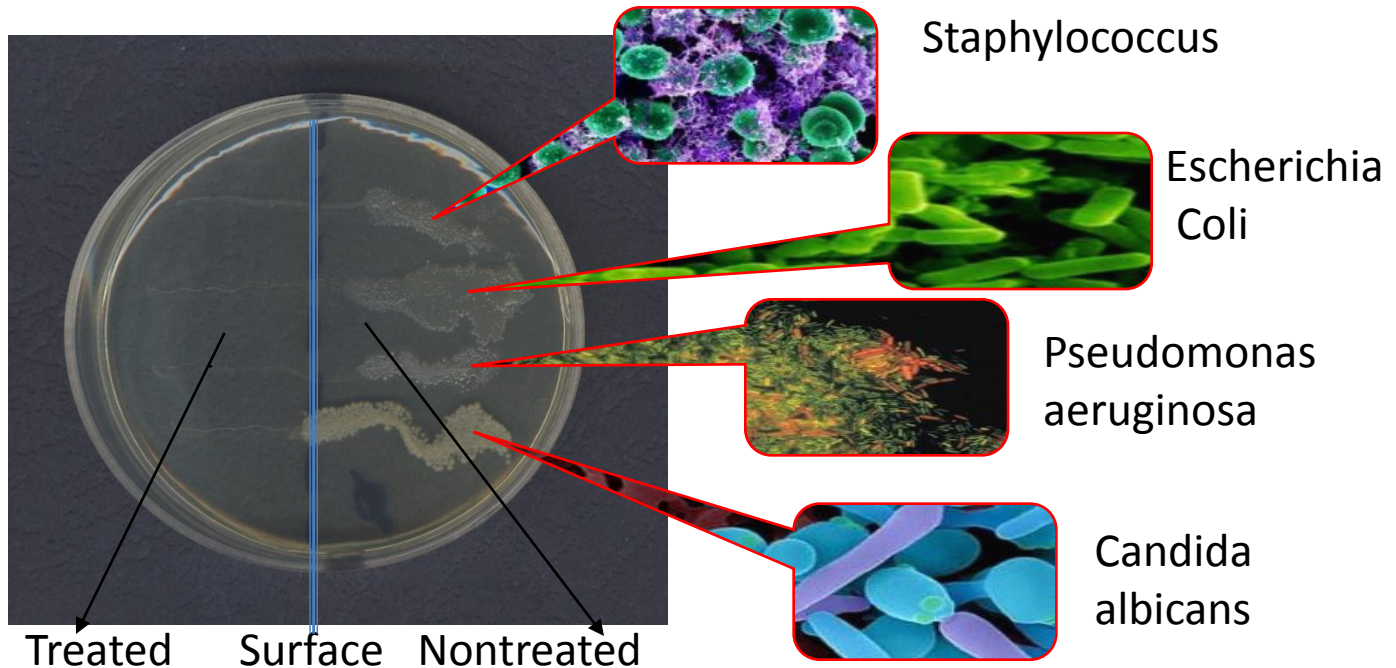
Particles average size : 30 nm NAg



Applications: Antimicrobial additives ready to be mixed with dozens of End-products containing glycerol as ingredient. It can rapidly kill pathogen bacteria, viruses, fungus and other including: Staphylococcus, Salmonella arizona, E. Coli, H1N1, fungi, and many other.

Anti-Bacterial Anti-Viral activity of Nanoproduct “Silver Shield-1000”

Contact Surfaces Contaminated by Bacteria and Fungus treated by Nano Disinfectant “Silver Shield- 1000” keep sterility up to 5 days



Institute of Microbiology and Virology of the NAS Ukraine

Expert Conclusion about bactericidal activity of “Silver Shield-1000”

Concentration of Silver Shield 1000 (mg/liter)

1,5 mg/liter	6 mg/liter	9,9-15 mg/liter	7,5-10 mg/liter
80% Bacteria and Fungus stop grown in 2 min	99% Bacteria of <i>Escherichia coli</i> is killed in 3 min	100% <i>Candida albicans</i> is killed in 3 min	99% Vesicular stomatitis virus and avian and swine flu (AFM1/47 H1N1) decrease its activity over 20 times

“Silver Shield-1000” Toxicity Study

Institute of Ecohygiene and Toxicology Ministry of Public Health of Ukraine

Comparative Toxicity of the Certified Silver Based Pharmaceutical Products

vs

Nanoproduct “Silver Shield-1000” (concentration 100 mg/l)

Acute Toxicity Range	Dose: mg/kg weight of animal (rats)				
	Ion Silver AgNO ₃	Collargol	Protargol	Argovit	Silver Shield -1000
“Lethal Dose“ (LD₅₀) is the amount of a material, given all at once, which causes the death of 50% (one half) of a group of test animals.	125	70	250	500	7000*

***Toxical Hygienic Passport Issued by Institute of Ecohygiene and Toxicology Ministry of Public Health of Ukraine approved lowest toxicity of “Silver Shield-1000” among all certificated silver based pharmaceutical products in Ukraine**



Toxicology passport of “Silver Shield-1000” issued by

Institute of Ecohygiene and Toxicology Ministry of Public Health of Ukraine



Water solutions of Nano Product
Silver Shield – 1000

– NOT IRRITATE
the CONJUCTIVA



- NOT ALLERGIC



– NOT IRRITATE
HUMAN’S and PET’S SKIN



УДК 615.9
№ держрегистрації
01001000254
Рис.№6

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2009 г.

ОТЧЕТ
ПО НАУЧНО-ИССЛЕДОВАТЕЛЬСКОЙ РАБОТЕ
ПЕРВИЧНАЯ ТОКСИКОЛОГИЧЕСКАЯ ОЦЕНКА КОНЦЕНТРИРОВАННОГО
КОЛЛОИДНОГО РАСТВОРА СЕРЕБРА (SS-1000) И ВОДНЫХ РАСТВОРОВ НА ЕГО ОСНОВЕ
(заключительный этап, див.№ 7219)

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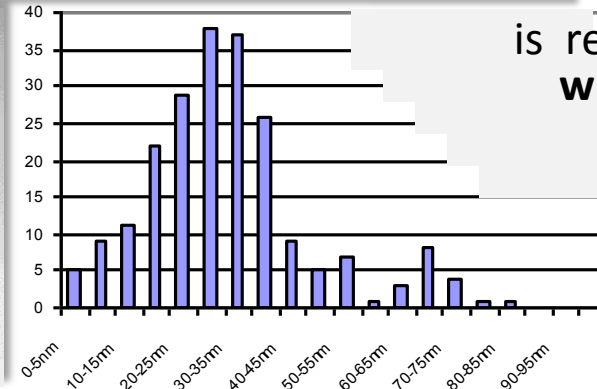
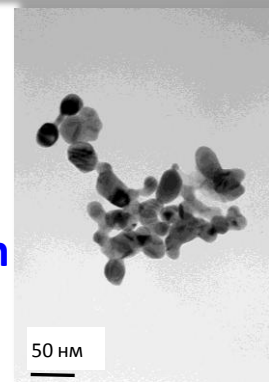
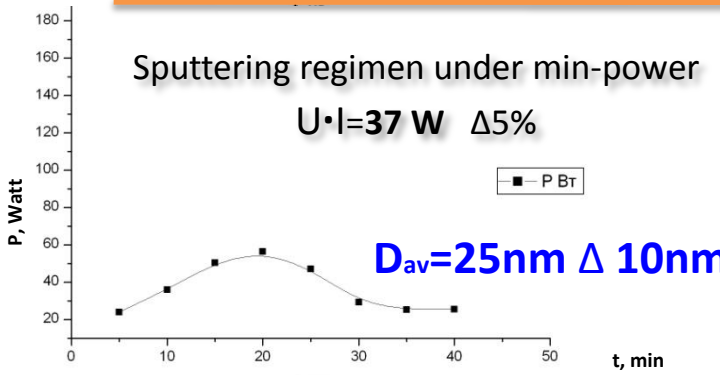
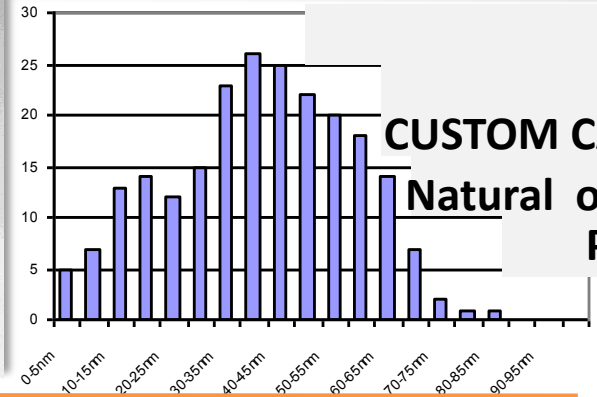
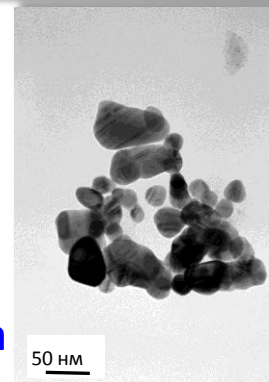
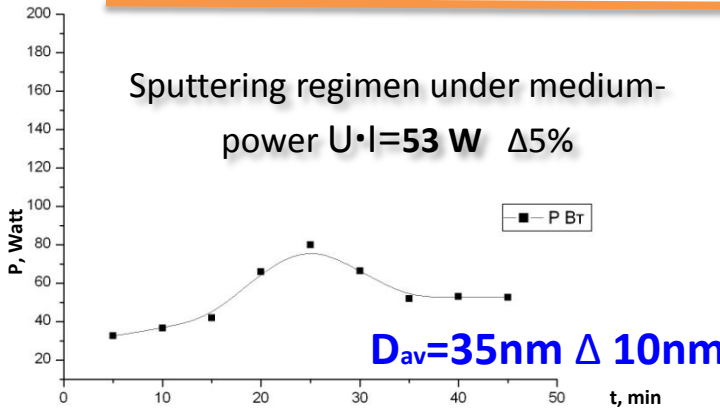
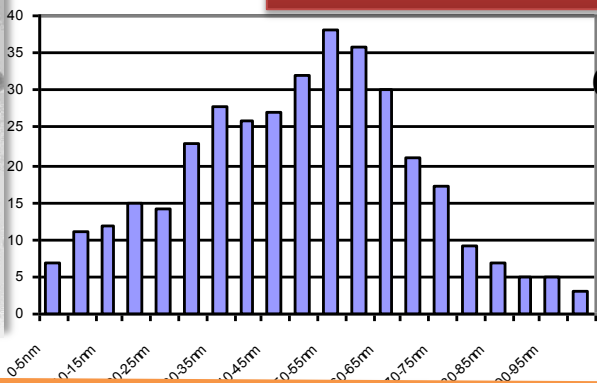
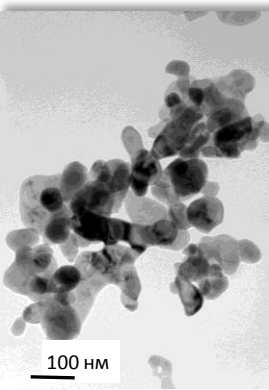
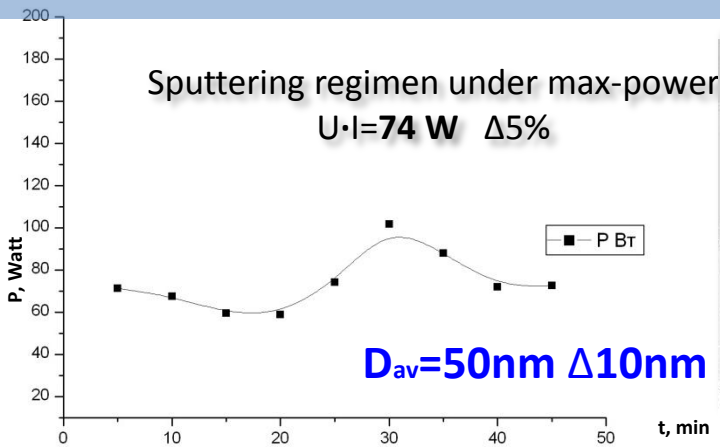
Controlled size and Distribution of Metal Nano Particle in Nano Products "NANOAGENT +"



Master Batch "NANOAGENT+"

CONCENTRATED STABLE BLEND of metallic Nano particles:
Au, Pt, Pd, Cu, Fe, Mo, Ti, etc
with CUSTOM CARRIER LIQUIDS:
Natural or Synthetic oils, Polysaccharides, Monomers, etc.

is ready to be mixed with end products



Advantages of Combined Dry-Wet Innovative Technology and Pilot Unit for Manufacturing of Ultra Clean Concentrated Nano Metals Dispersions in Various Carrier Liquids

Ultra Clean Dispersions in Various Carrier Liquids (water soluble and water non-soluble), biocompatible, eco-friendly, no traces of chemical wastes.

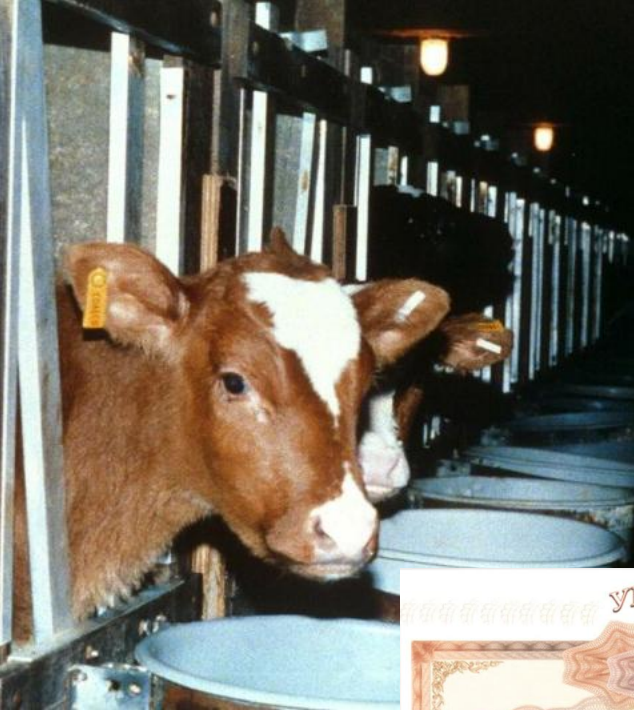
Easy Mixable with End-Products without Changing their Traditional Productive Technologies due to using as Carrier Liquids Already Existing End-Products Ingredients (FOOD GLYCERIN, NATURAL or SYNTHETIC OILS, POLYSACCHARIDES, PETROLEUM DERIVATIVES, etc.

Highly Concentrated (100-500 mg/liter) Stable Colloidal Solution or Nanosuspension not Required Special Measures for Transportation and Storage.

Controlled size and distribution of **nanometals encapsulated in carrier liquids** to regulate the particles surface area, **less toxicity of nanoadditives**.

Highly Productive Ecologically Safe Industrial Units Capable to vary productivity due to Custom Modular Design.

Cleaning of contaminated by Staphylococcus milk with “Silver shield - 1000”



**0,36 ml “Silver Shield-1000”
cleans 1 Liter of Milk
Contaminated by
Staphylococcus in 15 min**



- Treatment of traditional masks with nano Silver product SS-1000 can upgrade it's protective qualities against virus H1N1 and to rize protective time in 3-5 times



3-4 sprays to inner and outer Surfaces of Mask enough to upgrade the mask antivirus activity

MATRIX ECO NANO SILVER



FIELDS OF APPLICATION

Acrylic paint **Matrix Eco Nano Silver** designed for surface finishing of building structures and elements inside buildings on common construction surfaces (concrete, brick, cement-sand plaster, gypsum plaster, etc.) and organic bases (wallpaper, polystyrene board, plywood, chipboard) that carry high operational loads. Can be used in high humidity areas, prevent mold.



Ingredients

Water-based acrylic resin with inorganic fillers modified with **Nano Product "Silver Shield 1000"** (controlled size, distribution and concentration).



NANO SILVER WALL PAINT



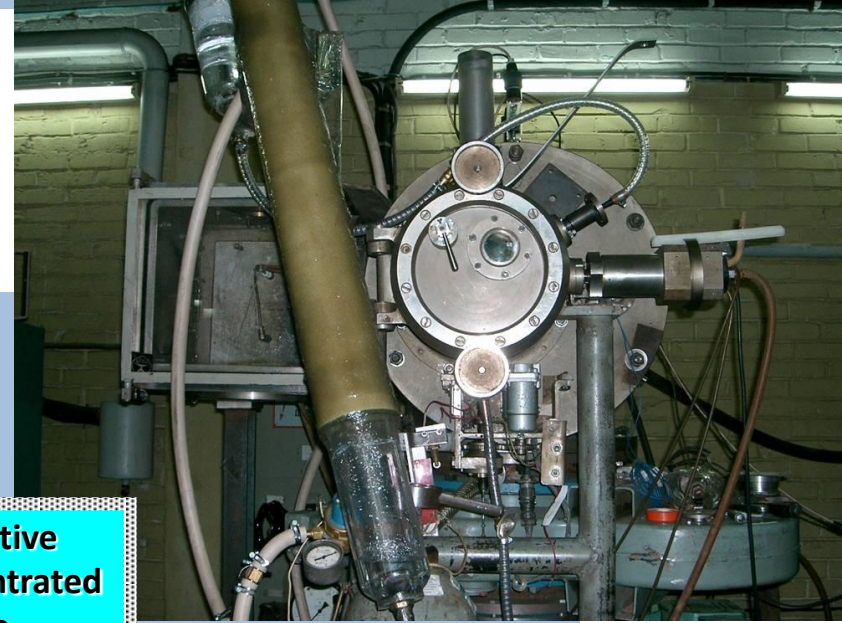
Innovative Technology and Pilot Modular Line for Manufacturing Ultra Clean Concentrated Nano Metals Dispersions in Various Carrier Liquids

•What we are offering:

•Semi-industrial Master Batches - Dispersions of Nano Silver, Nano Gold, Nano Platinum and dozens of other Nano Metals dispersed in custom liquid media with the proof of size, distribution, biocompatibility and quality by the best world Labs

•Pilot Unit for one-step productive manufacturing of highly concentrated Ultra Clean Dispersions of Nano Metals in Various Liquids with variable productivity (6-24 tons per year) due to Custom Modular Design.

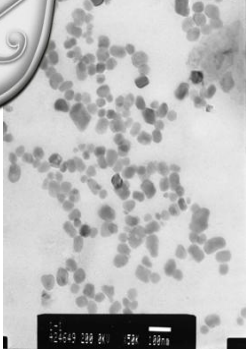
•Green Technology and Know-how Based on LIPS Technology - Patented in USA and Ukraine method of metals sputtering in vacuum with controllable size nano Particles (Localized Ion-Plasma Sputtering – LIPS, Pat. USA 5,591,313; Ukraine Patent #80513)



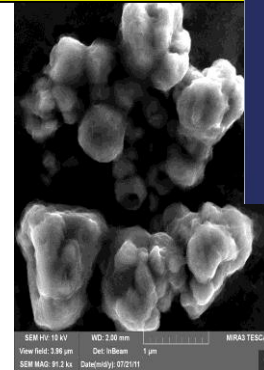
WAY OF COLLABORATION



nanoAg in Food Glycerin



nanoMe in various liquids



**ORDERS
FOR CUSTOM NANO DISPERSIONS**

**JOINT VENTURE
FOR END PRODUCTES
MANUFACTURING**

**EXCLUSIVE LICENSE FOR TECHNOLOGY
AND INDUSTRIAL UNIT FOR CUSTOM
MASTER BUTCHES MANUFACTURING**

Thank you for attention

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