

NANOTECHNOLOGY

DEVELOPING USEFUL COLLOIDS WITH NANOSILVER
AND THEIR ANTIBACTERIAL APPLICATIONS



amepox

mgr Anita Smolarek, dr inż. Andrzej Mościcki

Przedsiębiorstwo Amepox 90-268 Łódź Jaracza 6 Poland

Tel. 042 6332202

Fax. 042 6326957

e-mail: amepox@amepox.com.pl

<http://www.amepox.com.pl>

<http://www.amepox-mc.com>

Seminar "Modern Technology
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2010

AMEPOX WORKS WITH EU PROJECTS

FP5 – NANOJOINING

Coordinator – *TNO*

EUREKA – MAJE

Coordinator – *SPS*

FP6 – STABILIGHT

Coordinator – *UNIPMN*

(Universita del Piemonte Orientale)

F16 Offset Program

EURIPIDES – CANOPY

Coordinator – *THALES ALENIA
SPACE*

FP7 – NanoFate

Coordinator – *NERC*

FP7 – PRIAM

Coordinator – *CRF*

Domestic (Polish) Grants (actual with 3 Grants)

AMEPOX COOPERATION WITH SCIENTIFIC INSTITUTES

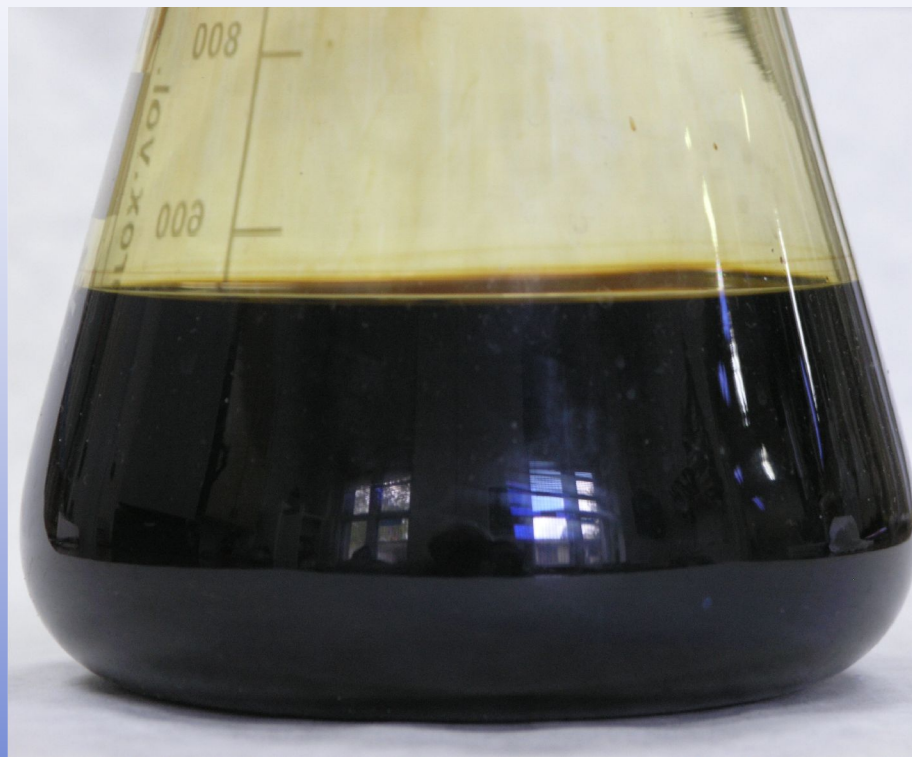
1. Technical University – Wrocław, Poland
2. Technical University – Łódź, Poland
3. Technical University – Warsaw, Poland
4. University of Łódź – Solid State Physic Dept., Poland
5. Polish Academy of Science – Warsaw, Poland
6. Fraunhofer Institut – Brema, Germany
7. Fraunhofer IZM – München, Germany
8. Fraunhofer Microelectr. Circuits & Systems – Duisburg, Germany
9. Paul Sabatier University – Toulouse, France
10. Oxford University – Oxford, England
11. TNO Science & Industry – Endhoven, Nederland
12. VTT Technical Research Centre of Finland – Oulu, Finland, ... and other.

DEVELOPING OF THE SMALLEST nAg (size 3–8 nm) DISPERSION IN WATER

NANOSILVER

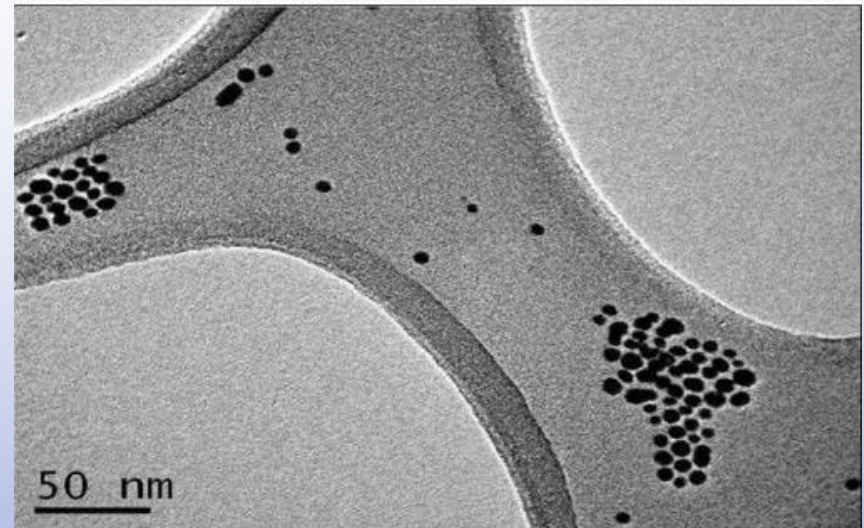
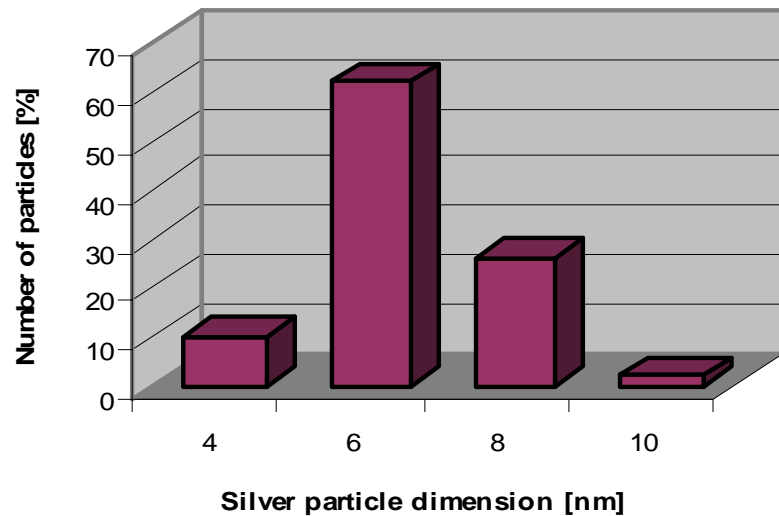


nAg – dry powder form



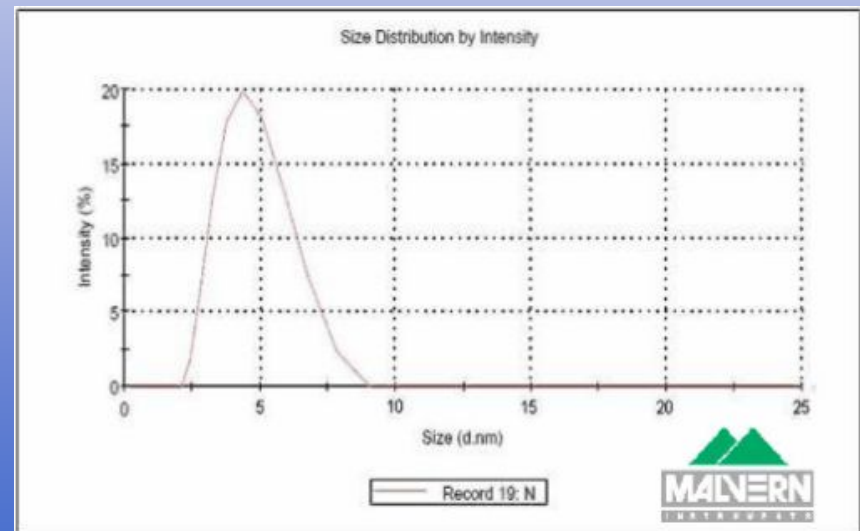
nAg dissolved in nonpolar

NANOSILVER

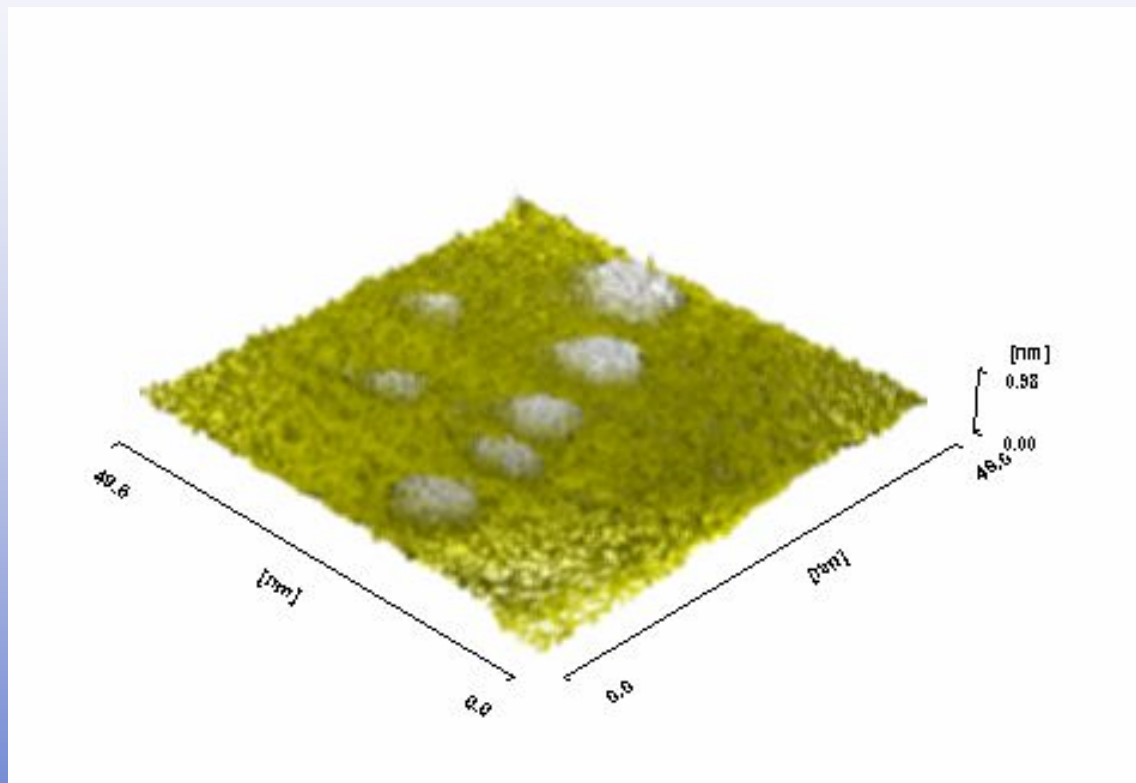


Nanosilver particle size distribution

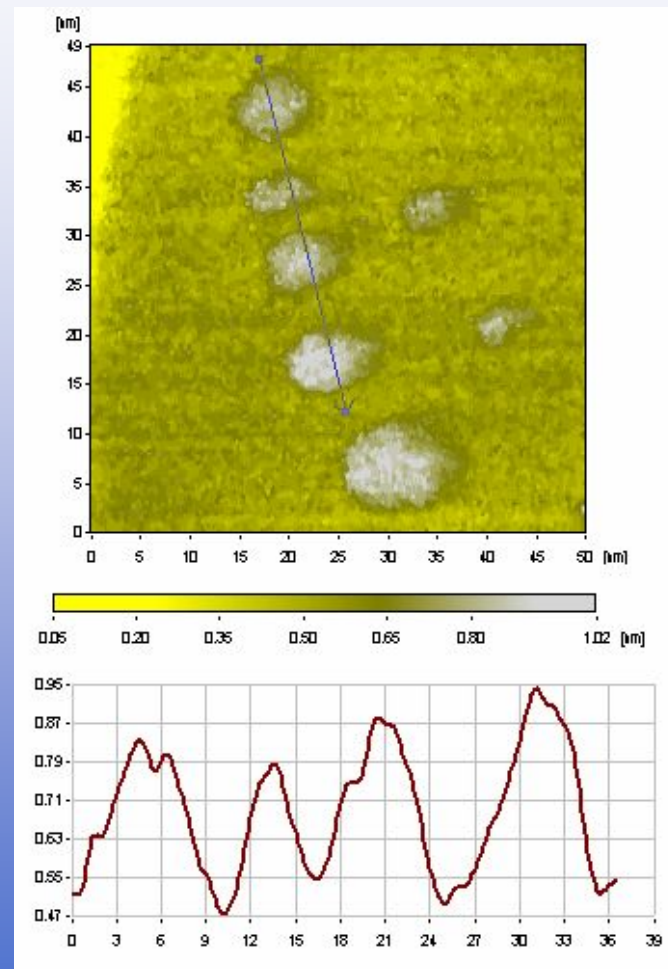
(Ag atom diameter – 0.29 nm)



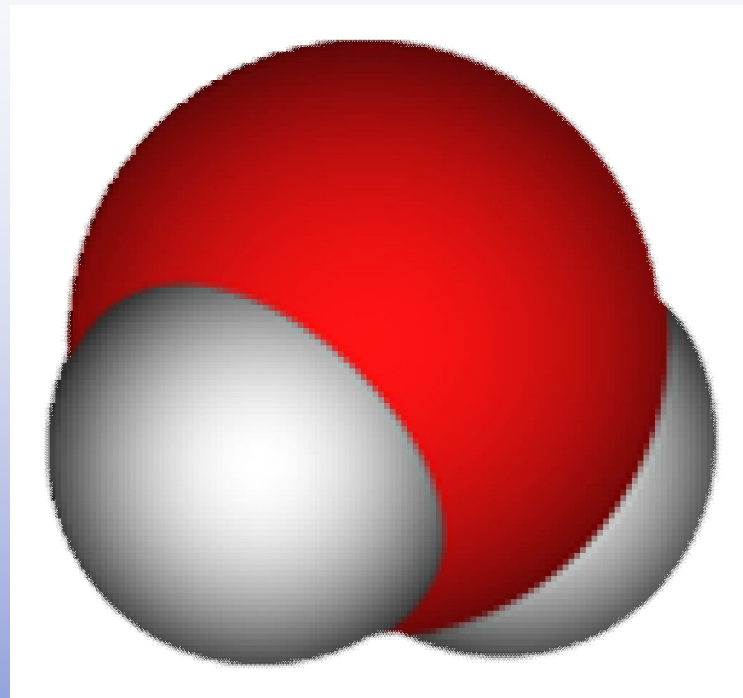
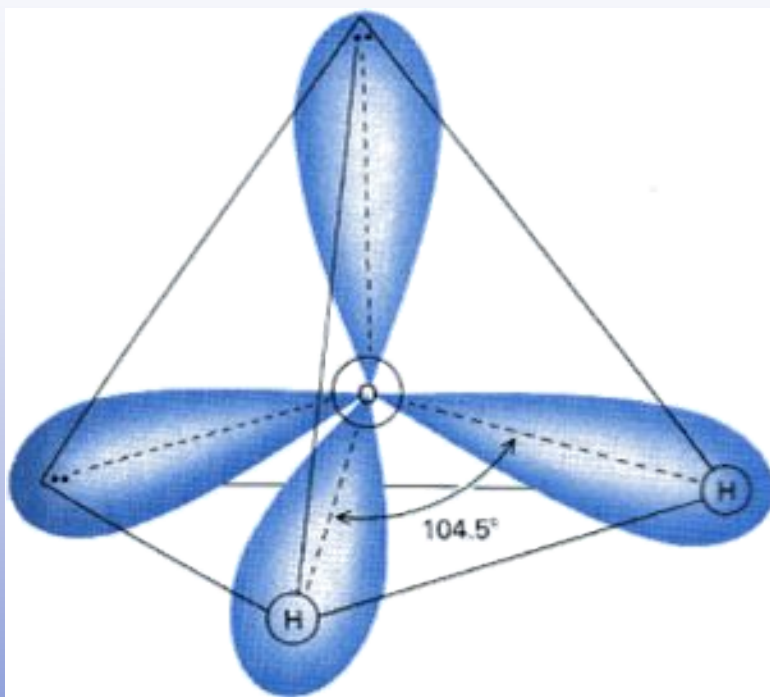
NANOSILVER



*Nanosilver size measurements
by TEM equipment*



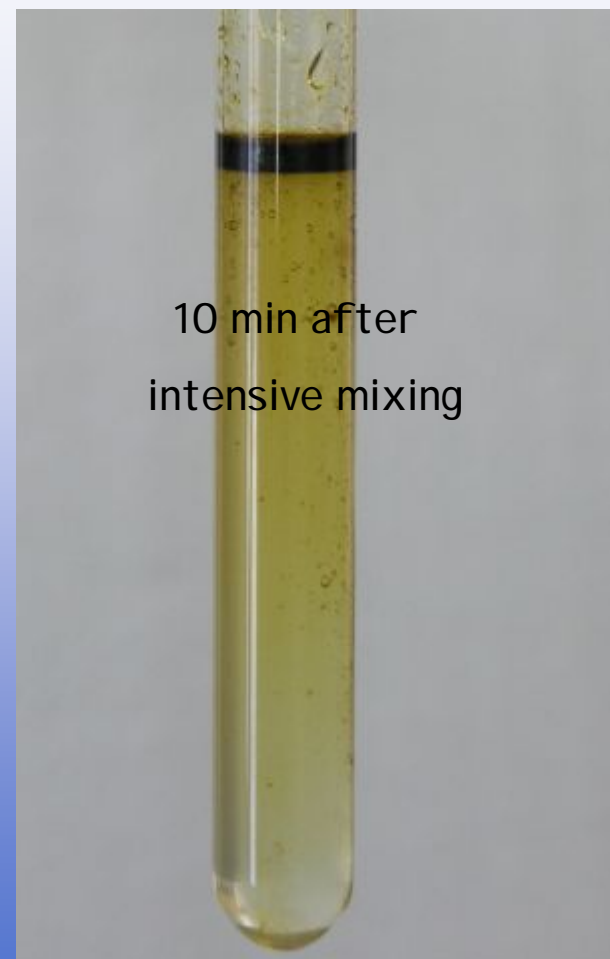
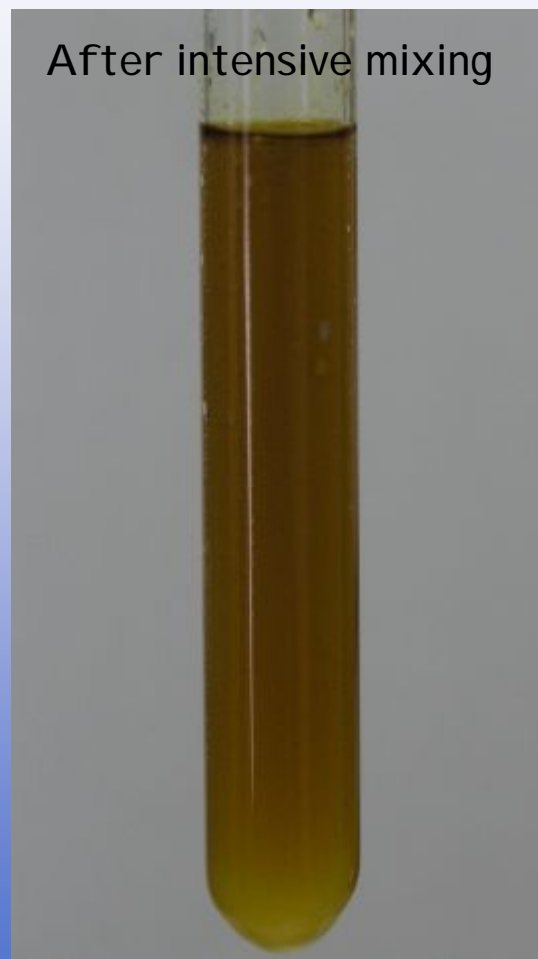
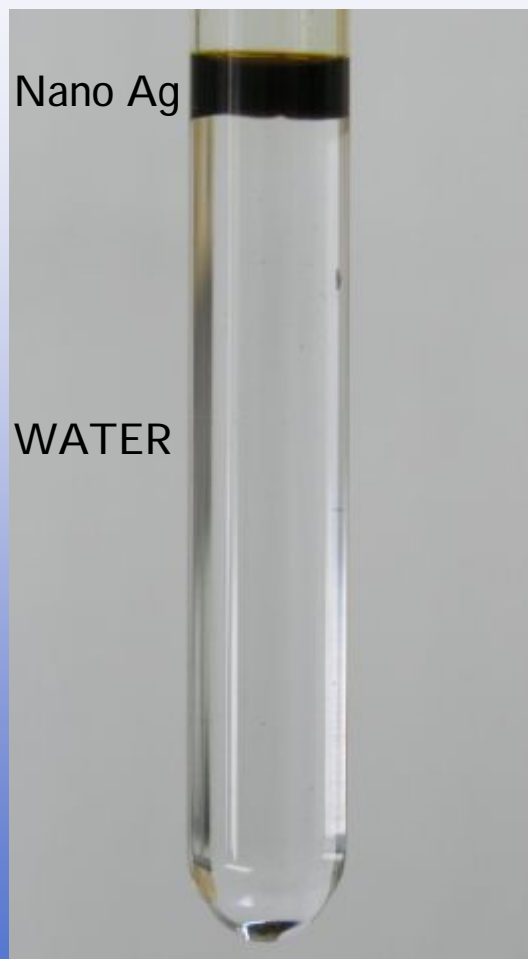
WATER TYPE ENVIRONMENT



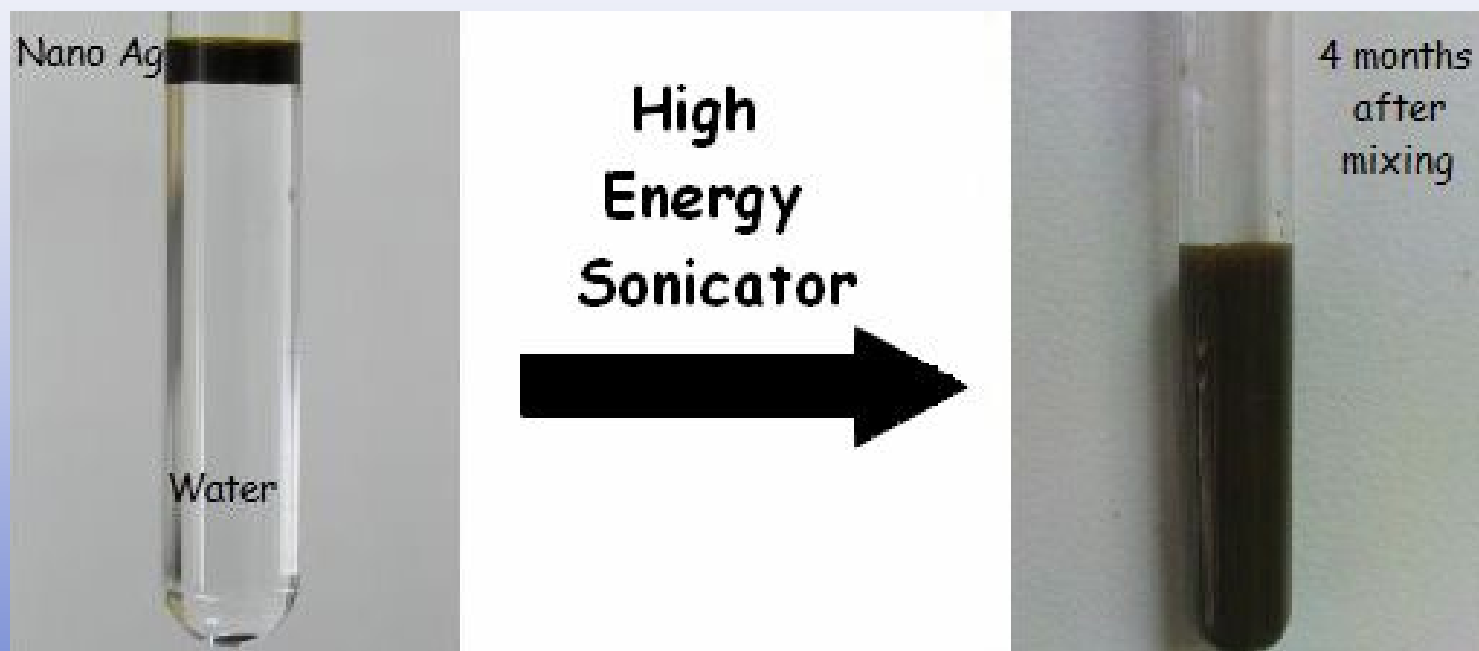
Water has very strong dipole moment value 1.84

[1D = 10⁻¹⁸ dyn^{1/2} cm²]

WATER TYPE ENVIRONMENT



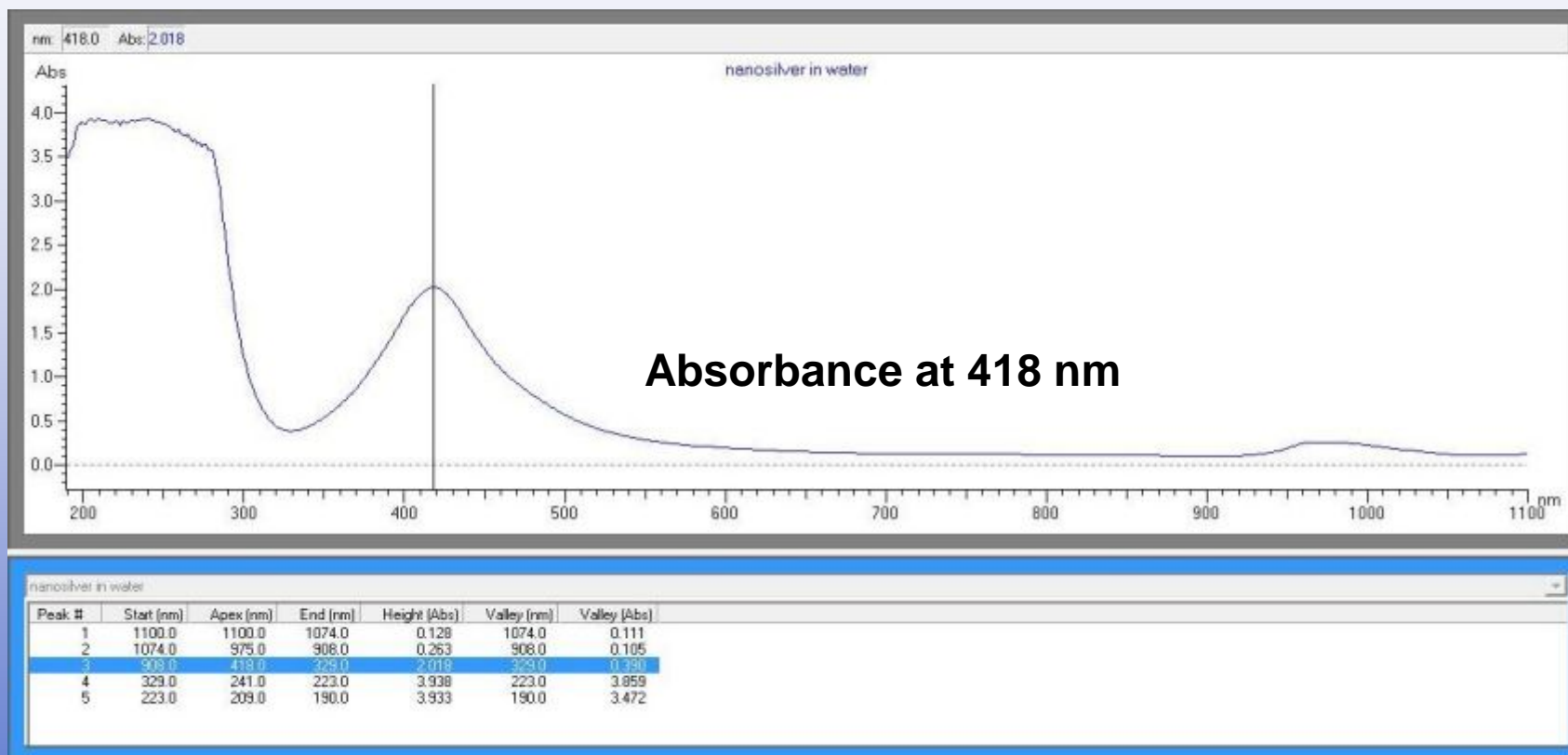
AMEPOX WORKS WITH PREPARATION OF THE WATER BASE COLLOIDS ESPECIALLY FOR ENVIRONMENT TESTS CONNECTED WITH NanoFate PROJECT.



Implantation nAg in water type environment

COLLOIDS WITH NANOSILVER 3 -8 nm

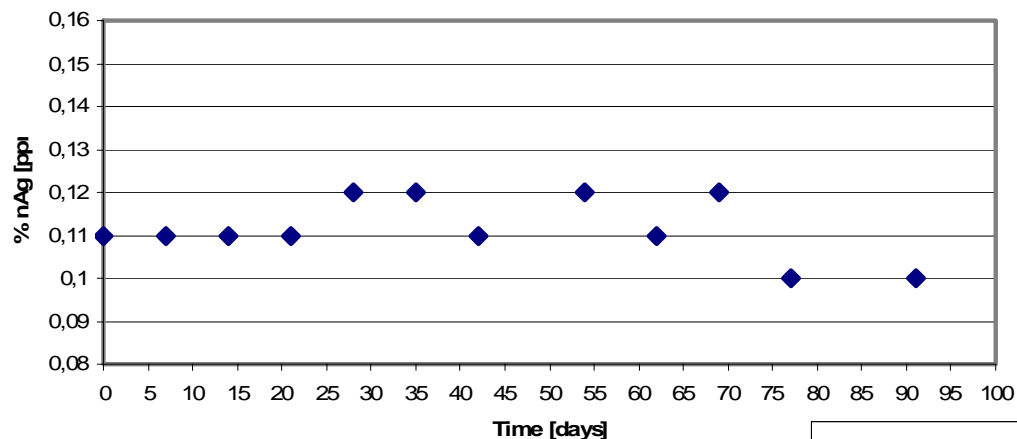
HOW TO QUALIFY NANOSILVER CONCENTRATION IN CASE OF WATER ?



Wavelength measurement for nAg inside

COLLOIDS WITH NANOSILVER 3 -8 nm

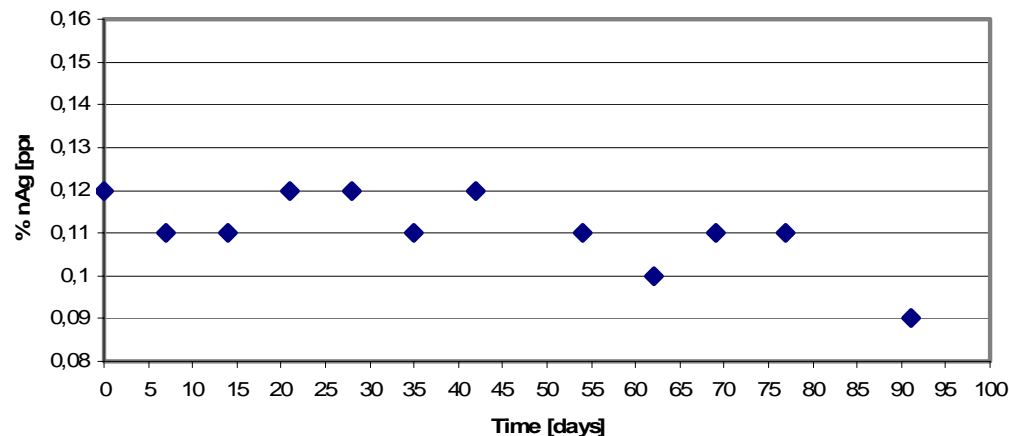
Concentration nAg in water as a function of time



*LONG TERM STABILITY TEST
FOR WATER BASE nAg (3 – 8) nm
COLLOID*

*During 90 days
concentration deviations is
a range (0.02 – 0.03) %*

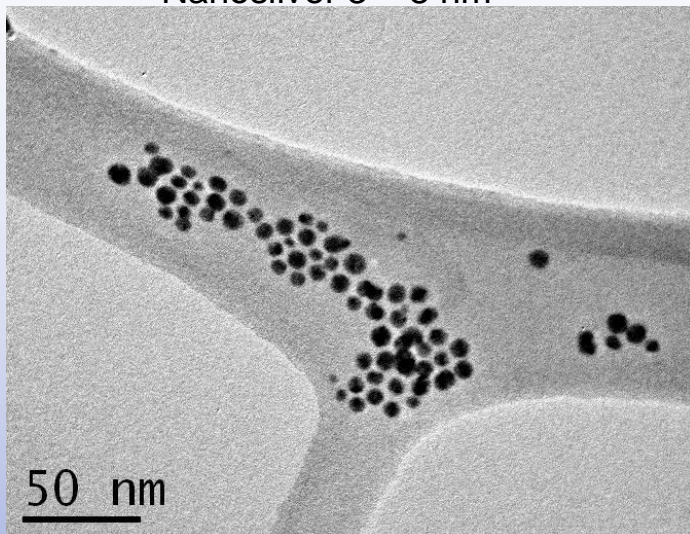
Concentration nAg in water as a function of time



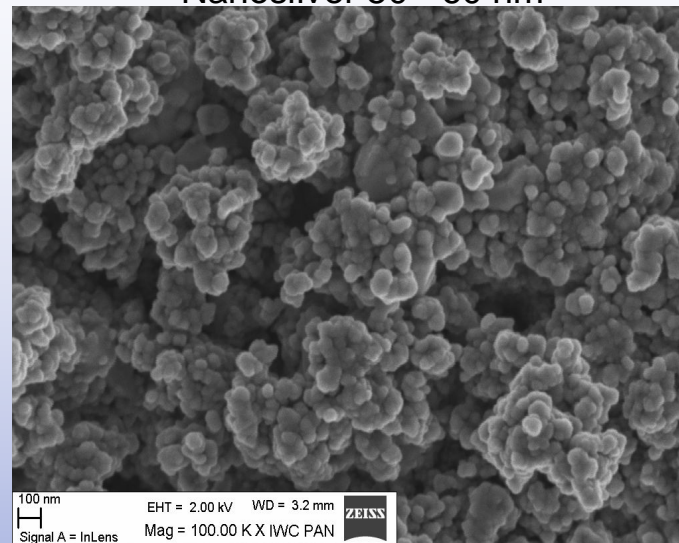
NANOSILVER FOR ANTIBACTERIAL APPLICATIONS

DIFFERENT TYPE OF SILVER

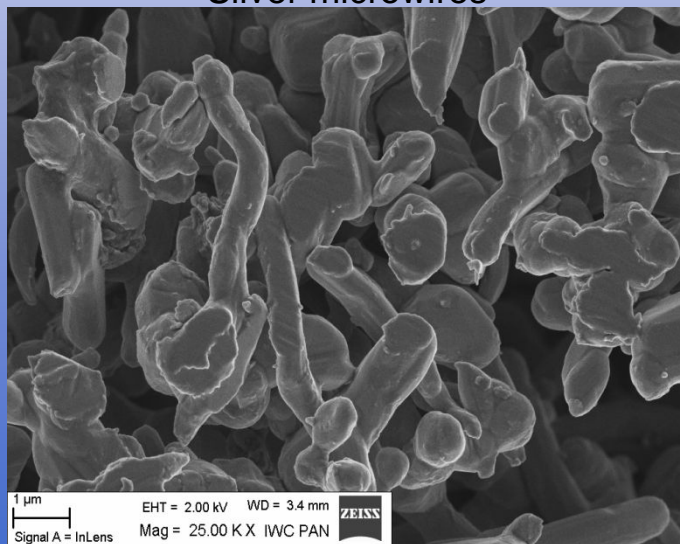
Nanosilver 3 – 8 nm



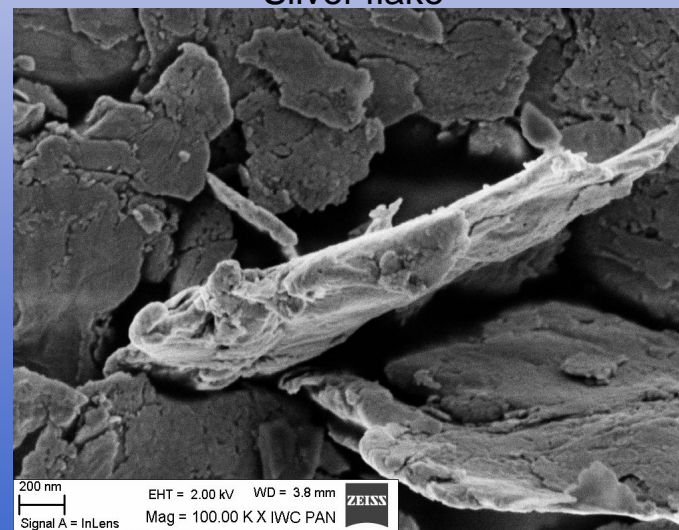
Nanosilver 50 - 60 nm



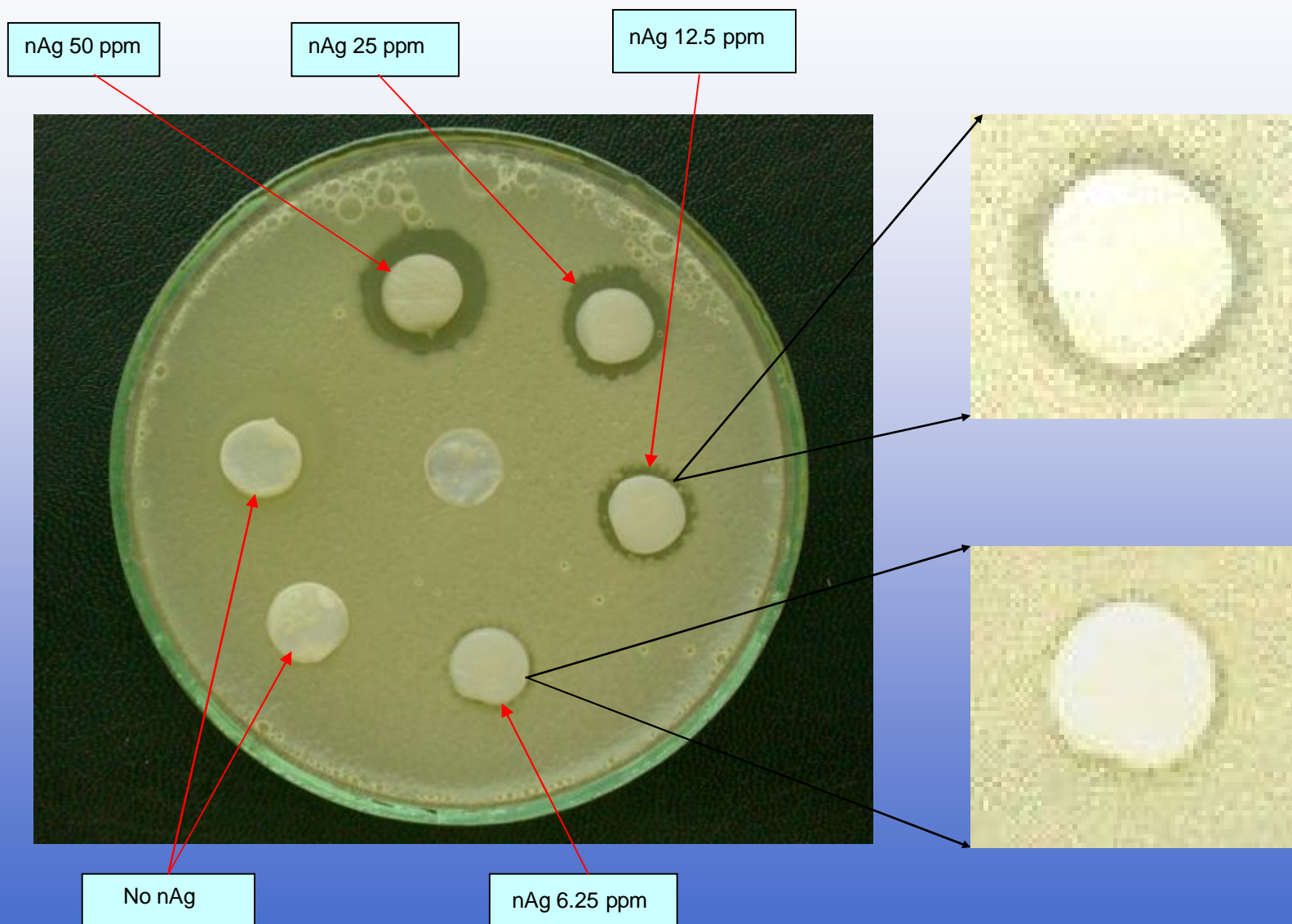
Silver microwires



Silver flake



NANOSILVER FOR ANTIBACTERIAL APPLICATIONS



(For example: *Bacillus subtilis*)

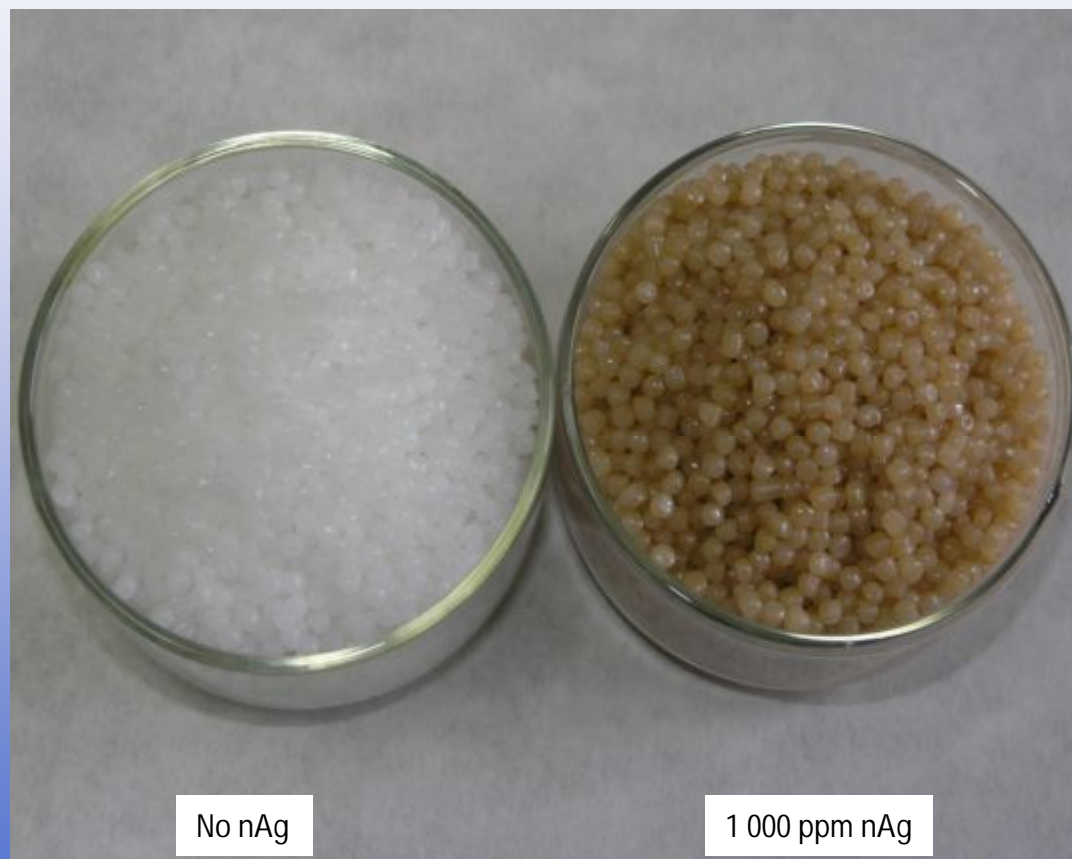
NANOSILVER FOR ANTIBACTERIAL APPLICATIONS.

The Main Areas for nAg Applications As a Antibacterial Additive:

- Additives to Thermoplastic Polymers,
- Additives to Foil for Food Packaging Purpose,
- Additives to Materials for Building Industry,
- Additives to Paper Industry,
- Additives to Textile Industry – Hotels, Hospitals, Food Production,
- Additives to Air Conditioner Filters,
- Additives to Cosmetics Applications,
- Additives to Implants, Dental, Skin Burns,
- and other...

NANOSILVER FOR ANTIBACTERIAL APPLICATIONS

Additives to Thermoplastic Polymers:



NANOSILVER FOR ANTIBACTERIAL APPLICATIONS

Additives to Foil for Food Packaging Purpose:



NANOSILVER FOR ANTIBACTERIAL APPLICATIONS

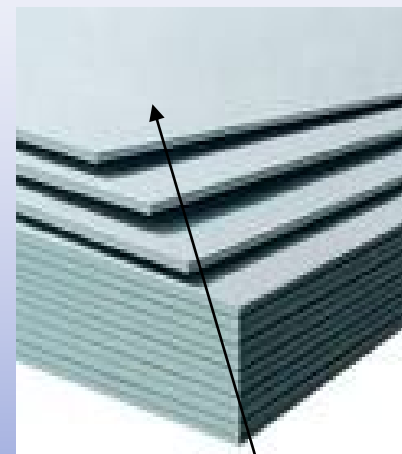
Additives to Materials for Building Industry:



Jointless Industry type Floors



*No Bacterias on the Top
and Bottom Floor Samples*



Gypsum – paper
walls sheet

NANOSILVER FOR ANTIBACTERIAL APPLICATIONS

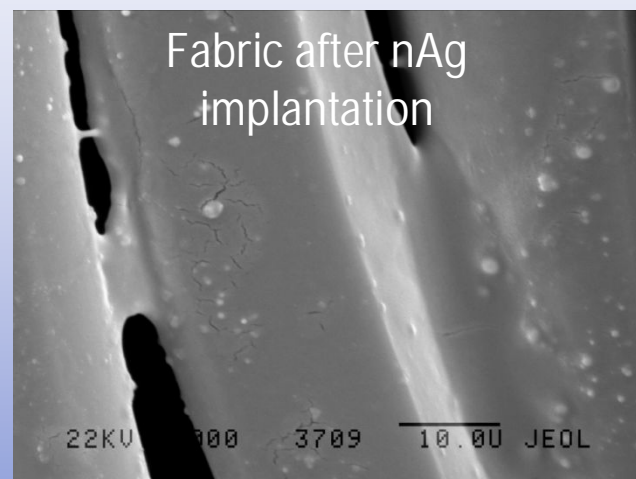
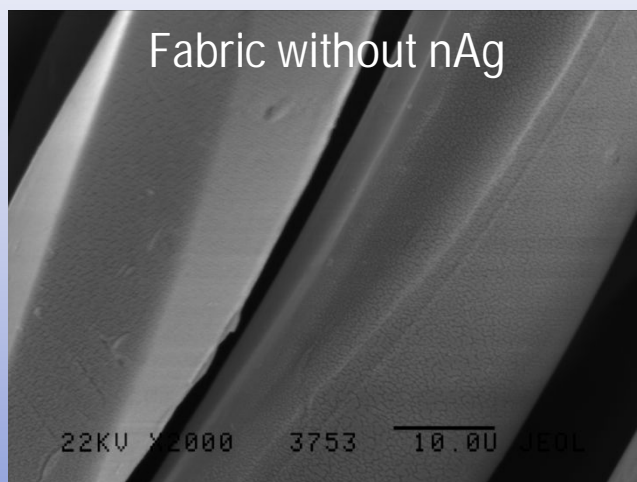
Additives to Paper Industry



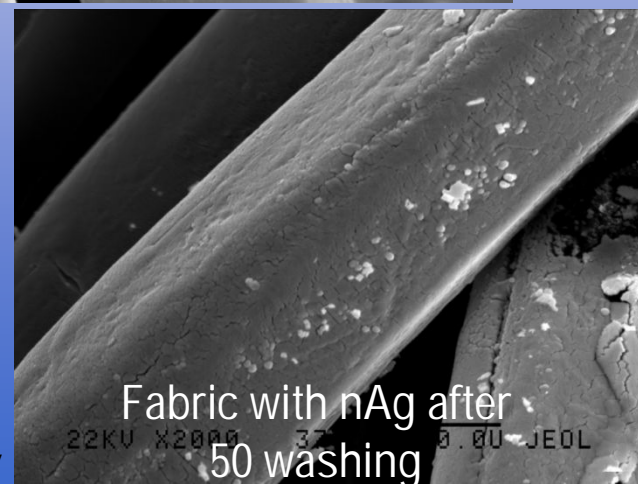
NANOSILVER FOR ANTIBACTERIAL APPLICATIONS

Additives to Textile Industry

As a results of cooperation with Textile Institute (Łódź), Amepox developed new, and unique method of stable nAg implantation to any kinds of fabrics.



International Standards says, that fabric should be stable during 20 washing processes.



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NANOSILVER FOR ANTIBACTERIAL APPLICATIONS

Additives to Implants, Dental, Skin Burns, ...



Skin Burns



Implants



Dental



ACKNOWLEDGEMENTS

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Grant agreement no.: CP-FP 247739 NanoFATE





THANK YOU FOR YOUR ATTENTION

WE WELCOME YOUR QUESTIONS,
SUGGESTIONS, COMMENTS.

AMEPOX

amepox@amepox.com.pl

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