Particles search
CUPRUM METAL.

MD Michel Van Wassenhoven

Mass Spectrometry SP-ICP-MS

- Cuprum metallicum.
  - SP-ICP-MS (metals): Single Particle Inductively Coupled Plasma Mass Spectrometry. in 20cc of 4CH dynamized water solution maximum 0,02µg of cuprum would be expected and 0,2g of Lactose.
  - Results in Cupr 4CH: In the solution, there is a **huge background signal but these particles are far too small to be detected by single particle ICP-MS**, the detection limit for copper particles is 45 nm (52 nm for Cu2O). Later on we did the same using a concentrate after lyophilisation of 200cc of solution with a similar outcome.

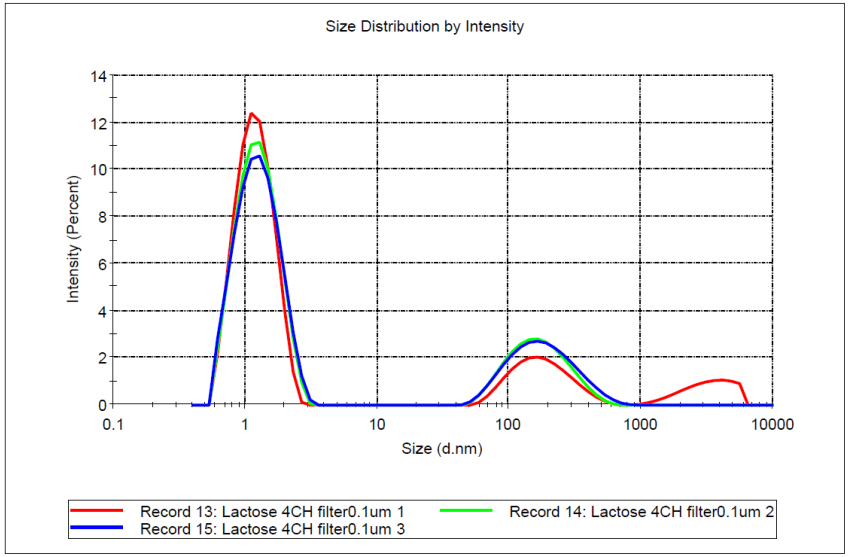
DLS – Zeta Potential
Cuprum metallicum 4CH

DLS : Dynamic Light Scattering

- Cuprum metallicum 4CH.

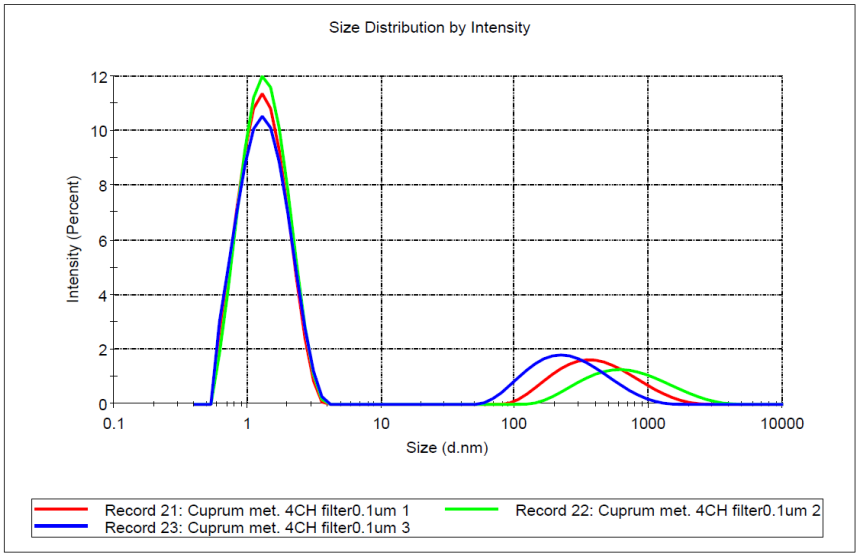
Results

Lactose



Mean 1,29 nm

Cuprum



Mean 1,41 nm

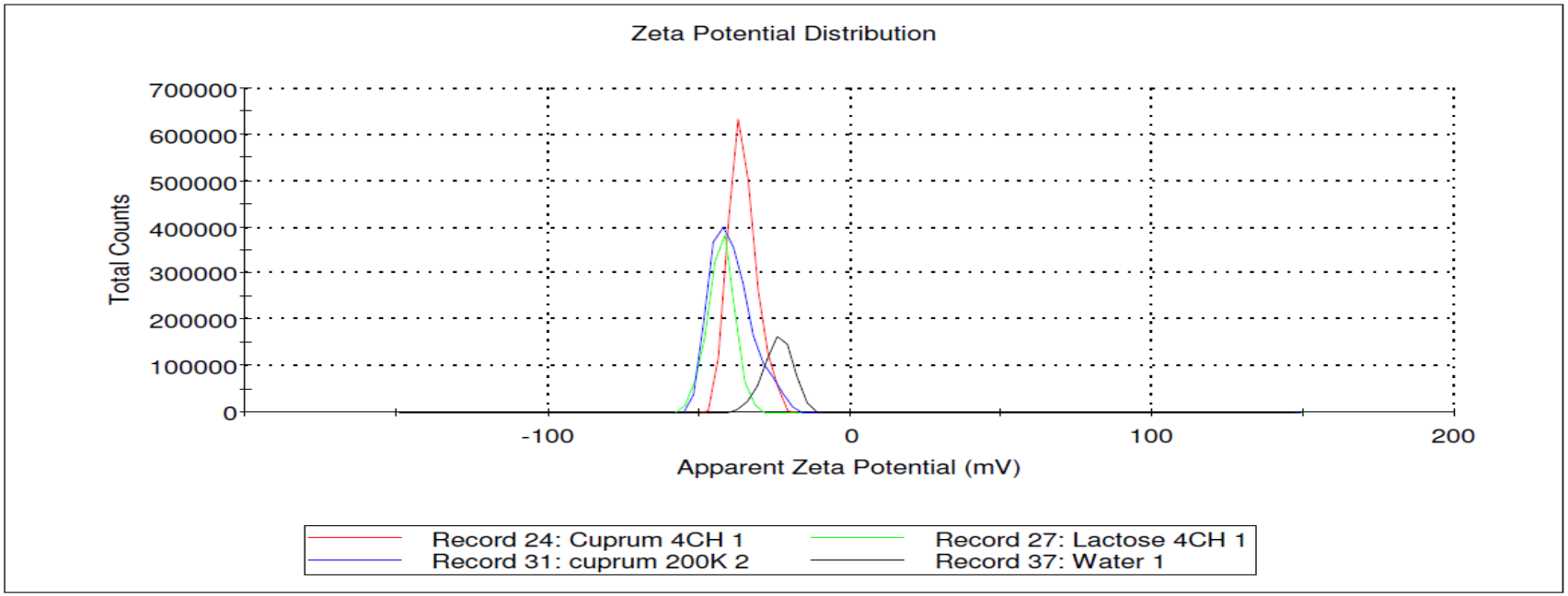
DLS : Dynamic Light Scattering

- Cuprum metallicum.

- **RESULTS conclusions:** Similar size of small nano-particles in cuprum 4CH and lactose 4CH, **between (0,5nm/2,5nm).** The presence of the expected 0,02µg of coper in 20cc cuprum metallicum 4CH dynamization is not yet confirmed but possible (small mean size difference compared with lactose control). These nano particles are **not detectable with DLS above 4CH.** Greater heterogeneity of particles in lactose 4CH.

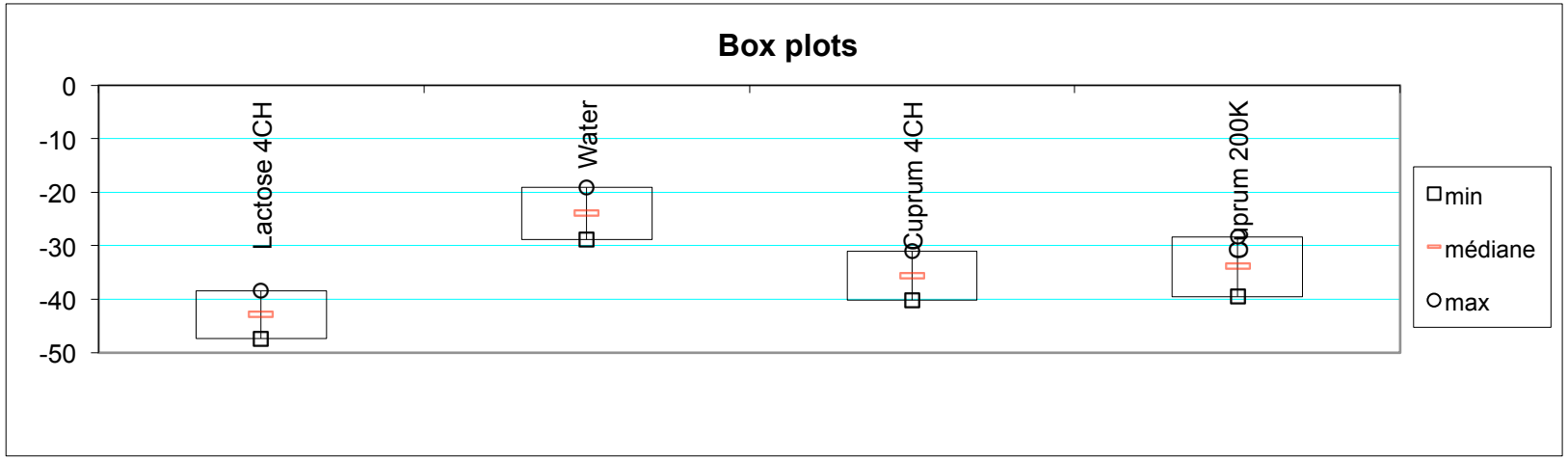
ZP : Zeta-Potential

- Cuprum metallicum.
- Zeta potential is a method for the measurement of the electrostatic potential at the electrical double layer surrounding a nanoparticle in solution.
- Zeta potential Cuprum 4CH median value -35,6mV, lactose -42,9mV, Water -24mV, Cuprum 200K -39,3mV. Note also that the total counts is significant higher and valid for Cuprum 4CH

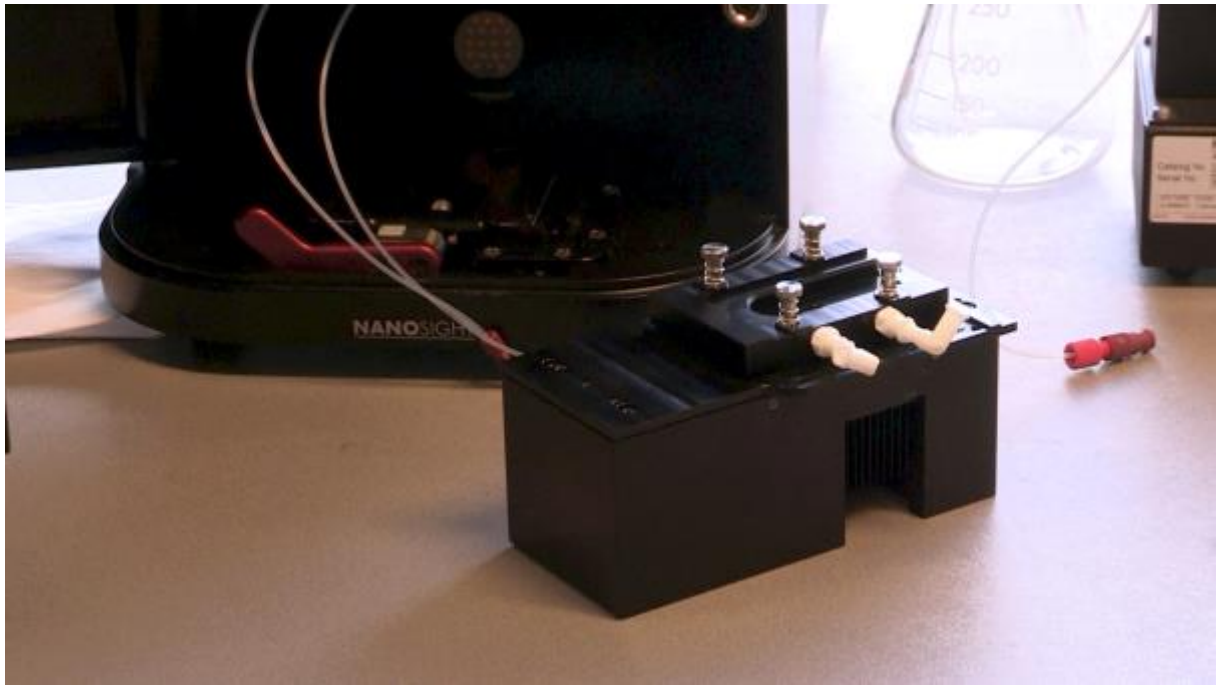


ZP : Zeta-Potential

- Cuprum metallicum.
  - **In opposition to DLS, if the preparation is filtered (filter 0,1µ) this signal became unstable and irrelevant. This means that other detected larger particles (see further) play a role in stabilisation of this information.**
  - **With zeta potential the mean difference between water control and other samples is significant and possible between Cuprum 4CH and lactose control.**



NTA
Cuprum metallicum



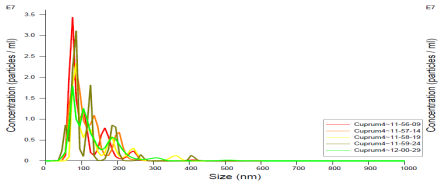
NTA : Nanoparticle Tracking Analysis

- Cuprum metallicum

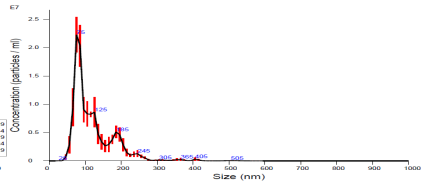
Nanosight:

- This technology is limited to particles above 20nm, we could see a significant amount of particles only in unfiltered samples.
- No particles in pure undynamised water control.

Cupr 4CH

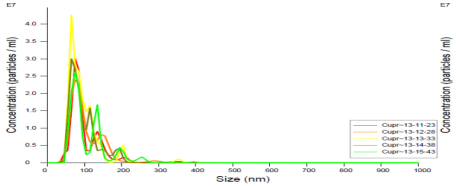


FTLA Concentration / Size graph for Experiment:
Cuprum4CH 2015-07-23 11-56-02

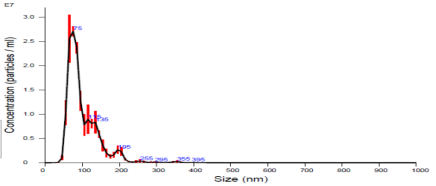


Averaged FTLA Concentration / Size for Experiment:
Cuprum4CH 2015-07-23 11-56-02
Error bars indicate + / -1 standard error of the mean

Cupr 10^{-8}

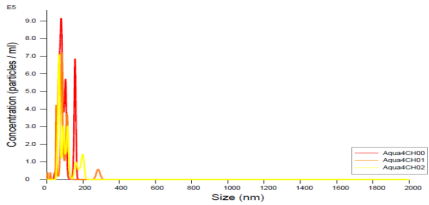


FTLA Concentration / Size graph for Experiment:
Cuprum 10-8diluted 2015-07-23 13-11-01

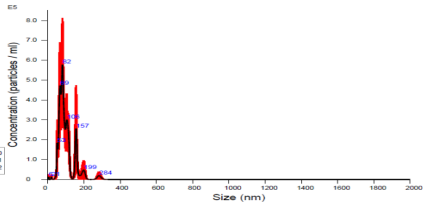


Averaged FTLA Concentration / Size for Experiment:
Cuprum 10-8diluted 2015-07-23 13-11-01
Error bars indicate + / -1 standard error of the mean

Aqua pura 4CH

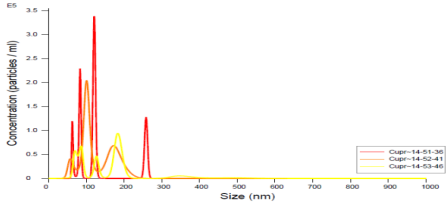


FTLA Concentration / Size graph for Experiment:
Aqua4CH

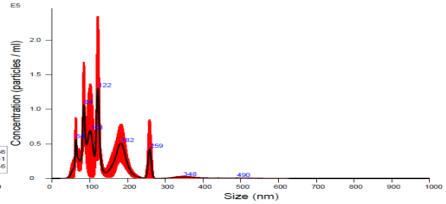


Averaged FTLA Concentration / Size for Experiment:
Aqua4CH
Error bars indicate + / -1 standard error of the mean

Cupr 30K

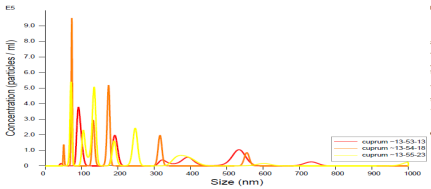


FTLA Concentration / Size graph for Experiment:
Cuprum30K-PET 2016-07-12 14-50-01

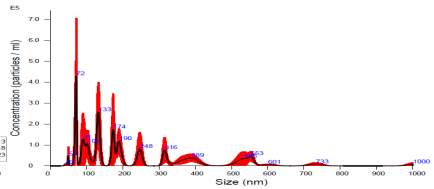


Averaged FTLA Concentration / Size for Experiment:
Cuprum30K-PET 2016-07-12 14-50-01
Error bars indicate + / -1 standard error of the mean

Cupr 30CH

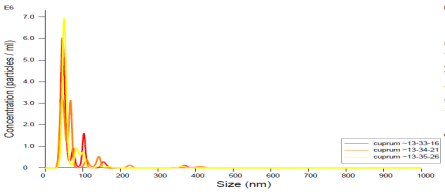


FTLA Concentration / Size graph for Experiment:
cuprum 30CH 2015-11-17 13-50-54

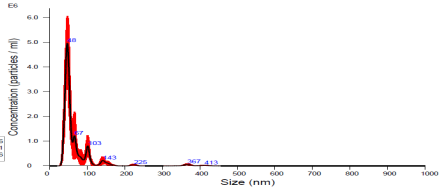


Averaged FTLA Concentration / Size for Experiment:
cuprum 30CH 2015-11-17 13-50-54
Error bars indicate + / -1 standard error of the mean

Cupr 200K

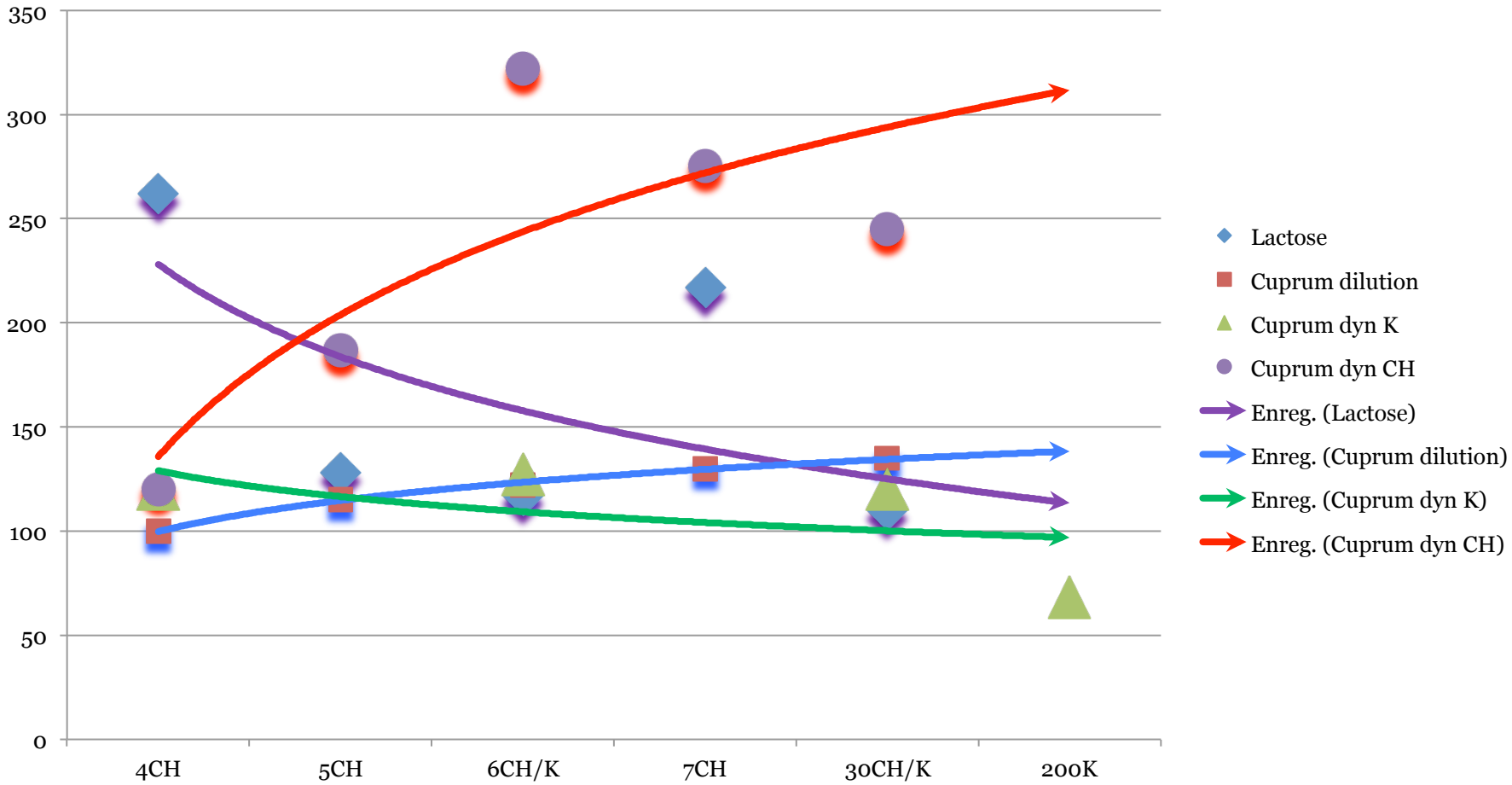


FTLA Concentration / Size graph for Experiment:
cuprum 200K 2015-11-17 13-30-52



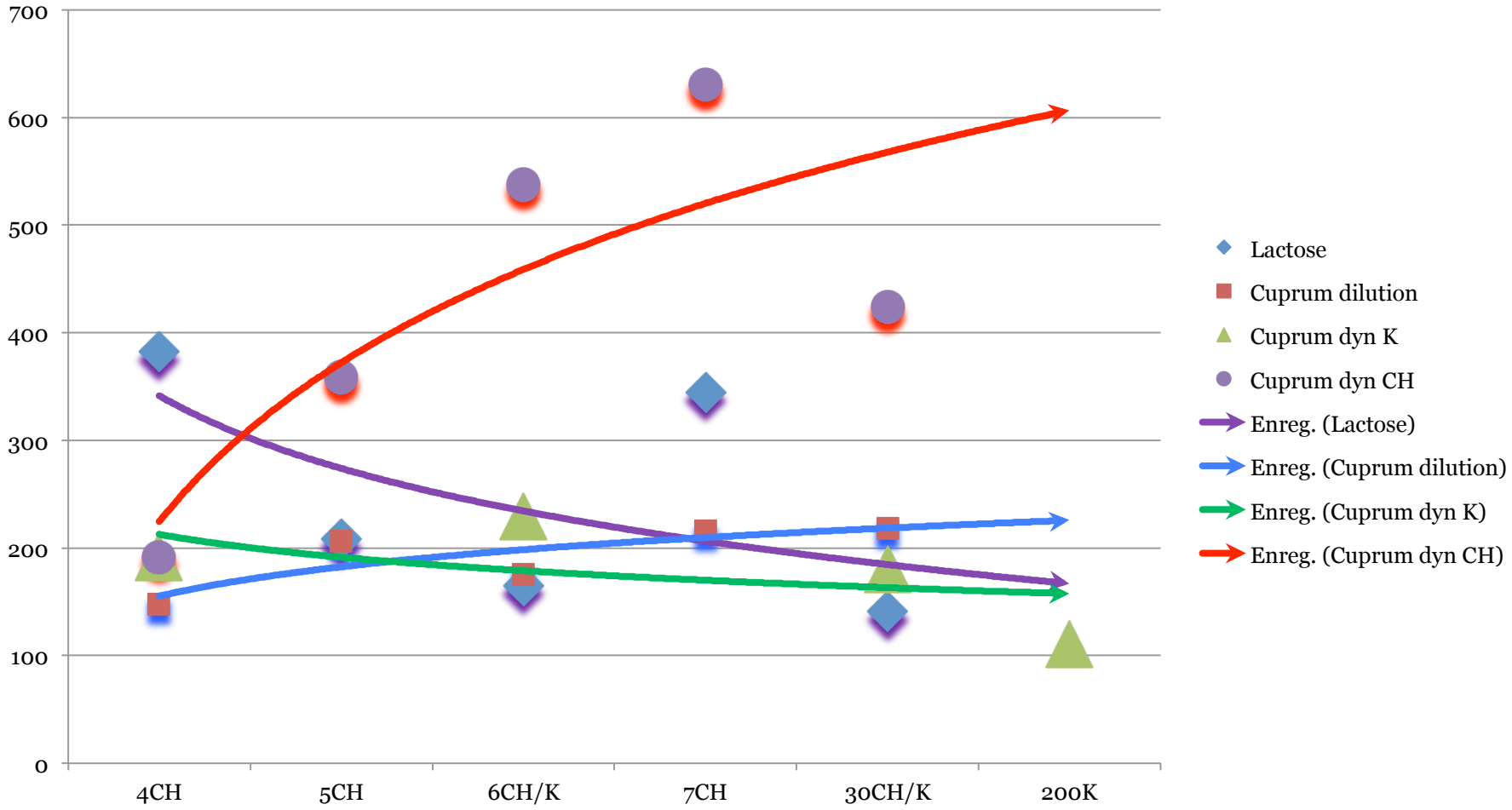
Averaged FTLA Concentration / Size for Experiment:
cuprum 200K 2015-11-17 13-30-52
Error bars indicate + / -1 standard error of the mean

Mean particules sizes in nanometers
(Cuprum metallicum and controls).



Particules sizes distribution (D90) in nanometers.

(Cuprum metallicum)



NTA : Nanoparticle Tracking Analysis

- Conclusions.
- The presence of particles even in highest dynamisation stay in a relatively stable concentration.
- **The particles sizes evolution for potentised Cuprum metallicum can clearly be differentiated from the two control groups.** The sizes and the dispersion of the particles sizes is growing only in CH potentized Cuprum.

SEM/EDX
Cuprum metallicum

SEM/EDX

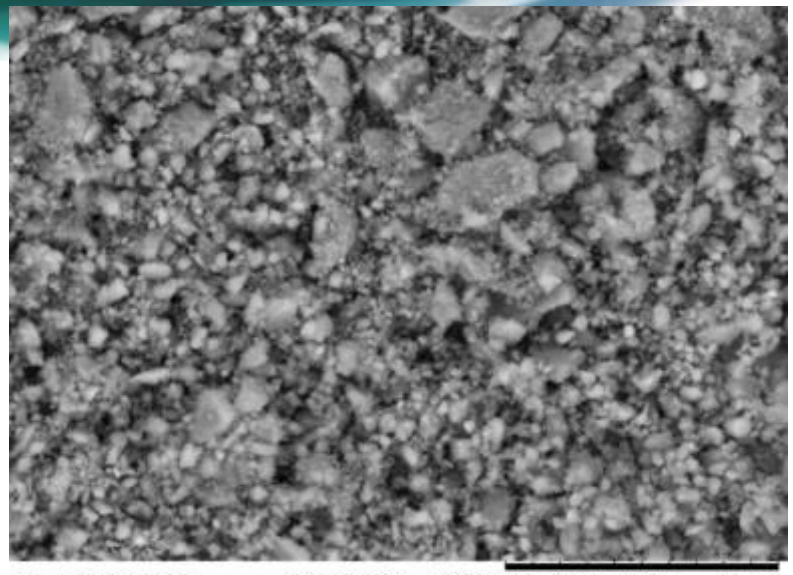
- Cuprum metallicum.

SEM/EDX = Scanning Electron Microscopy with X-ray microanalysis.

Starting from 400cc (20 x 20cc 4CH samples), lyophilized (concentrated) we are able to identify these particles. 200cc of 200K and 30CH, contains also particles !

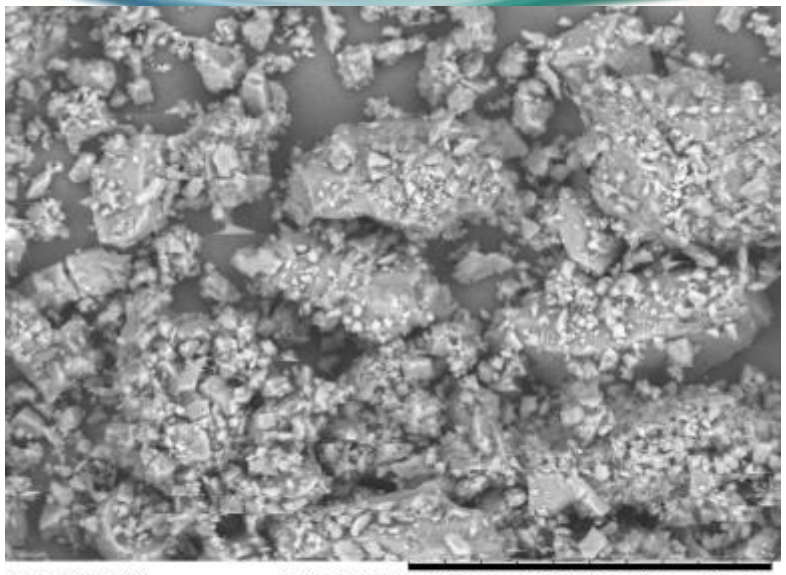
Quantities on obtained dry lyophilized material

	Uncertainty/g*	Stock /g	Lactose/g	Real dry material/g
Copper		999.990µg	0	
Cupr. met. 1C	+/- $3x10^{-9}$	10.000µg	990.000µg	
Cupr. met. 2C	+/- $3x10^{-9}$	+/-100µg	+/-999.900µg	
Cupr. met. 3C	+/- $3x10^{-9}$	+/-1µg	+/-999.999µg	
Cupr. met. 4C	+/- $3x10^{-9}$	In theory +/-0,01µg	+/-9.999,99µg	**9.500,0 µg**
Cupr. met. 30C	+/- $3x10^{-9}$	In theory +/-10^{-54}µg	+/-10^{-48}µg	**1,0 µg**
Cupr. met. 200K	+/- $3x10^{-9}$	In theory +/-10^{-396}µg	+/-10^{-388}µg	**2,5 µg**
Cupr. met. Diluted 10^{-60}	+/- $3x10^{-9}$	In theory +/-10^{-54}µg	+/-10^{-48}µg	**3,0 µg**
Cupr. met. 30C PET	+/- $3x10^{-9}$	In theory +/-10^{-54}µg	+/-10^{-48}µg	**1,5 µg**
Aqua pura 30C	+/- $3x10^{-9}$	In theory 0	0	**2,0 µg**
Arg. met. 30C	+/- $3x10^{-9}$	In theory +/-10^{-54}µg	+/-10^{-48}µg	**10,0 µg**
Arg. met. 200K	+/- $3x10^{-9}$	In theory +/-10^{-396}µg	+/-10^{-388}µg	**7,0 µg**
Arg. met. 10^{-60}	+/- $3x10^{-9}$	In theory +/-10^{-54}µg	+/-10^{-48}µg	**20,0 µg**
Silicea 30C	+/- $3x10^{-9}$	In theory +/-10^{-54}µg	+/-10^{-48}µg	**12,0 µg**
Silicea 200K	+/- $3x10^{-9}$	In theory +/-10^{-396}µg	+/-10^{-388}µg	**8,0 µg**
Silicea 10^{-60}	+/- $3x10^{-9}$	In theory +/-10^{-54}µg	+/-10^{-48}µg	**19,0 µg**
Kali.mur. 30C	+/- $3x10^{-9}$	In theory +/-10^{-54}µg	0	**17,0 µg**
Gelsemium 30C	+/- $3x10^{-9}$	In theory +/-10^{-54}µg	0	**36,0 µg**



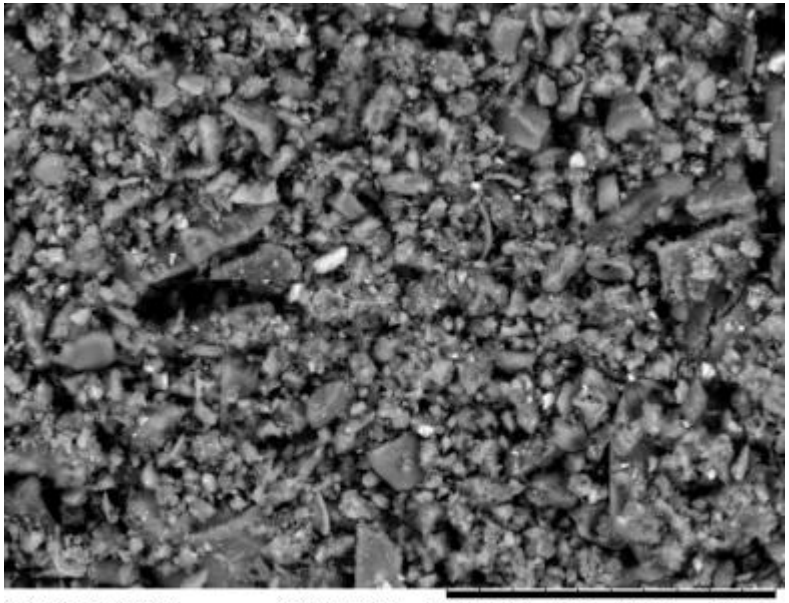
Aqua 30CH 0000 2016/04/26 12:28 HM D8.0 x2.5k 30 µm

SYSMEX-Hitachi TM3030PLUS



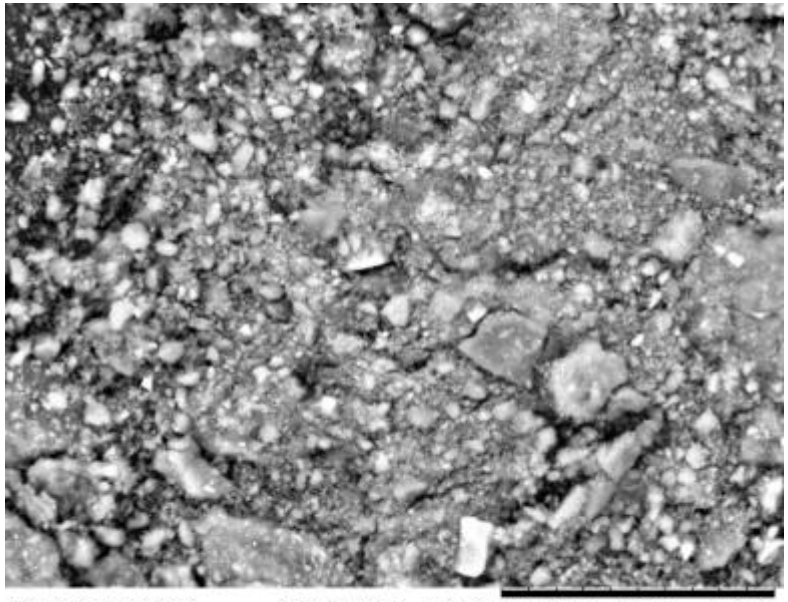
CH4 V2 0000 2016/04/26 13:30 HM D7.9 x1.0k 100 µm

SYSMEX-Hitachi TM3030PLUS



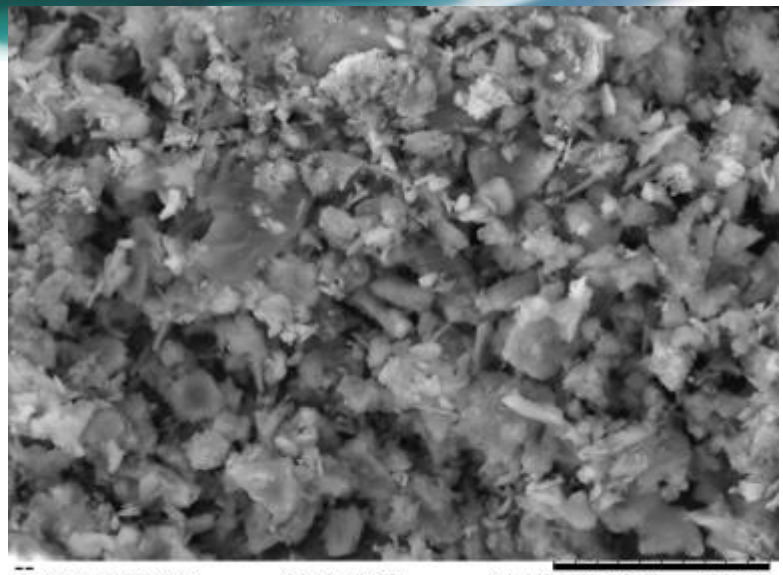
CUPR 30C 0000 2016/04/26 12:13 HM D8.0 x1.8k 50 µm

Hitachi TM3030PLUS Qrum30C



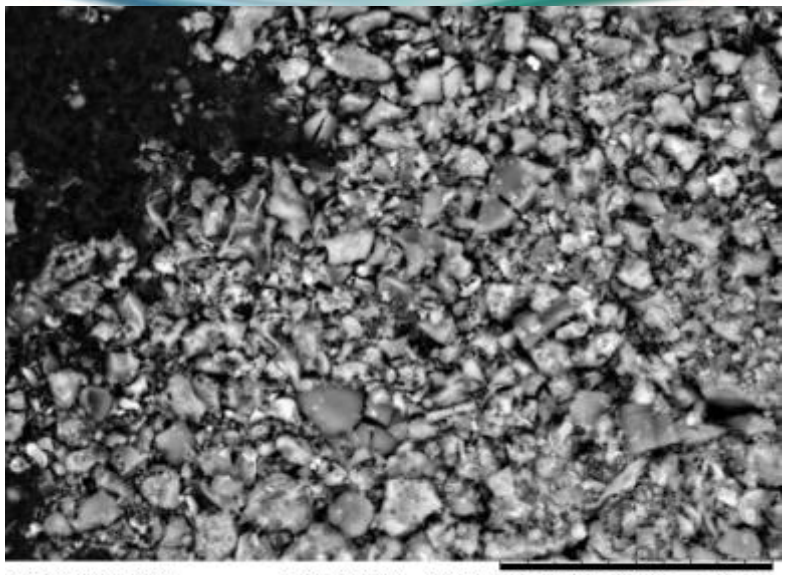
CUPR 200K 0000 2016/04/26 12:01 HM D8.1 x2.5k 30 µm

Hitachi TM3030PLUS Qrum 200K



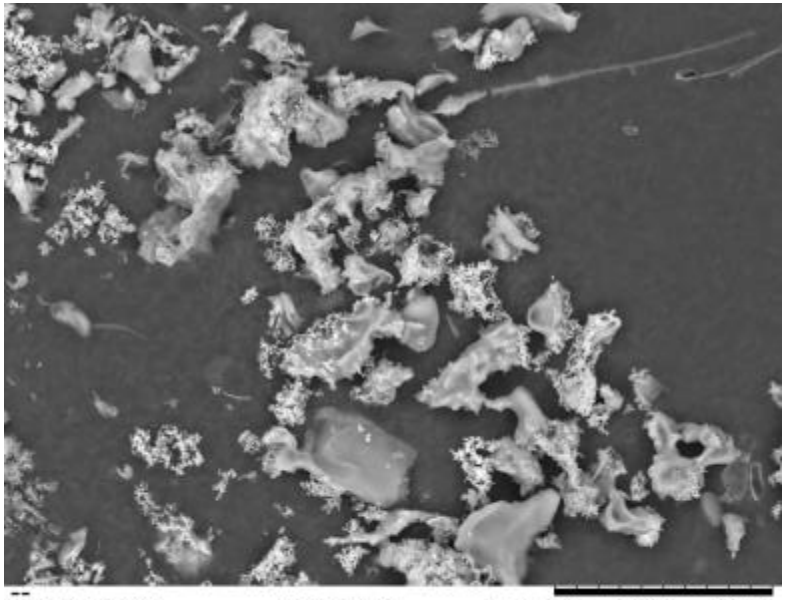
Cu30CH PET0001 2016/12/28 NL UD8.0 x2.0k 30 µm

SYSMEX-Hitachi TM3030PLUS



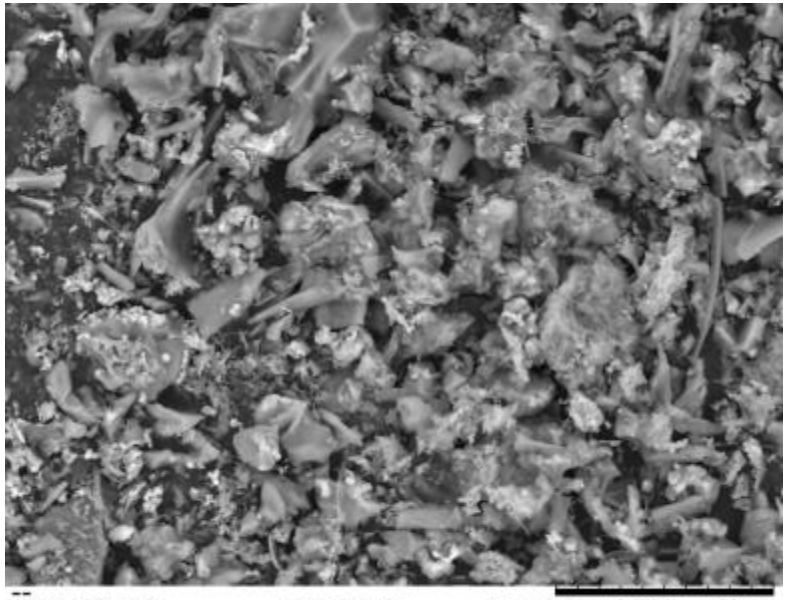
CUPR 60 0000 2016/04/26 11:43 HM D8.0 x2.5k 30 µm

Hitachi TM3030PLUS Qrum 10 -60



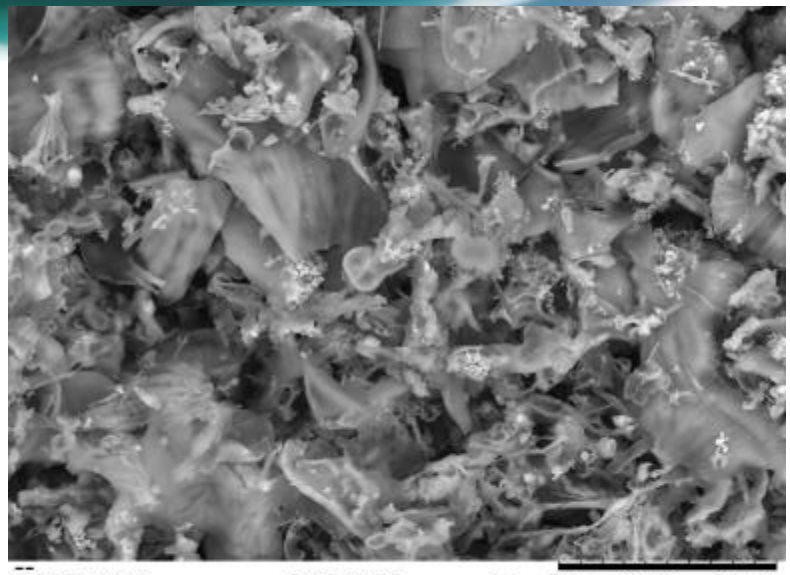
AM30CH 0000 2016/12/28 HM D8.1 x2.0k 30 µm

SYSMEX-Hitachi TM3030PLUS



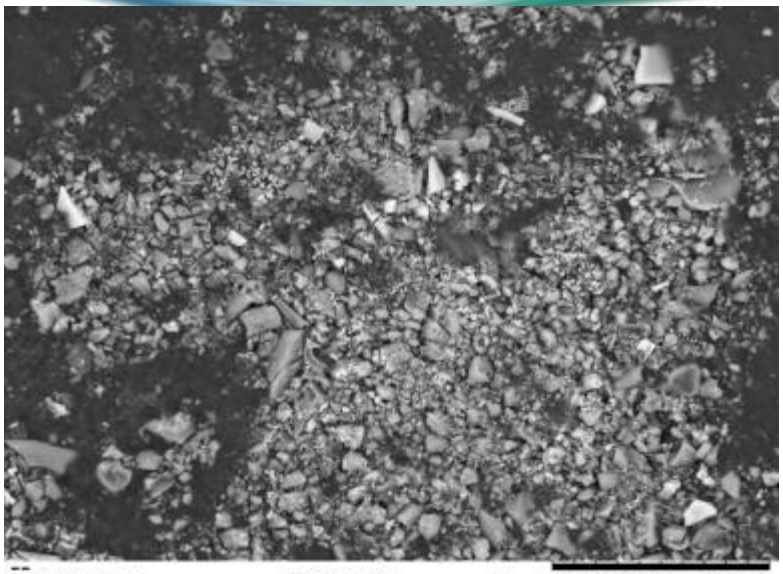
AM200K 0000 2016/12/28 HM D8.1 x2.0k 30 µm

SYSMEX-Hitachi TM3030PLUS



Si30CH 0000 2016/12/28 HL D8.1 x2.0k 30 µm

SYSMEX-Hitachi TM3030PLUS

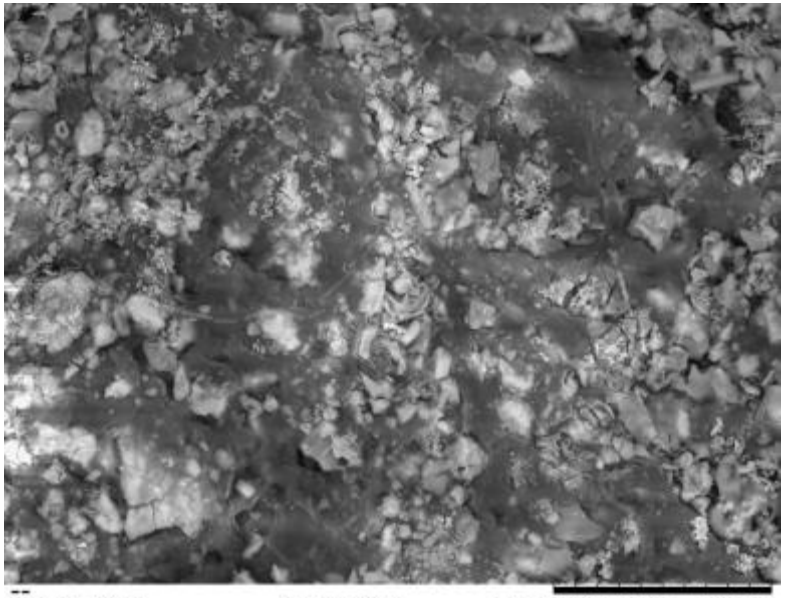


Si200K 0000 2016/12/28 HL D8.1 x2.0k 30 µm

SYSMEX-Hitachi TM3030PLUS

SI10-60 0000 2016/12/28 HL D8.0 x2.0k 30 µm

SYSMEX-Hitachi TM3030PLUS



K30CH 0000 2016/12/28 HM D8.0 x2.0k 30 µm

SYSMEX-Hitachi TM3030PLUS

SEM

- Cuprum metallicum.

Conclusions: Clearly it is possible, using this methodology, to differentiate visually cuprum metallicum in several potentisations from controls or other remedies.

CH and K preparations generate specific images.

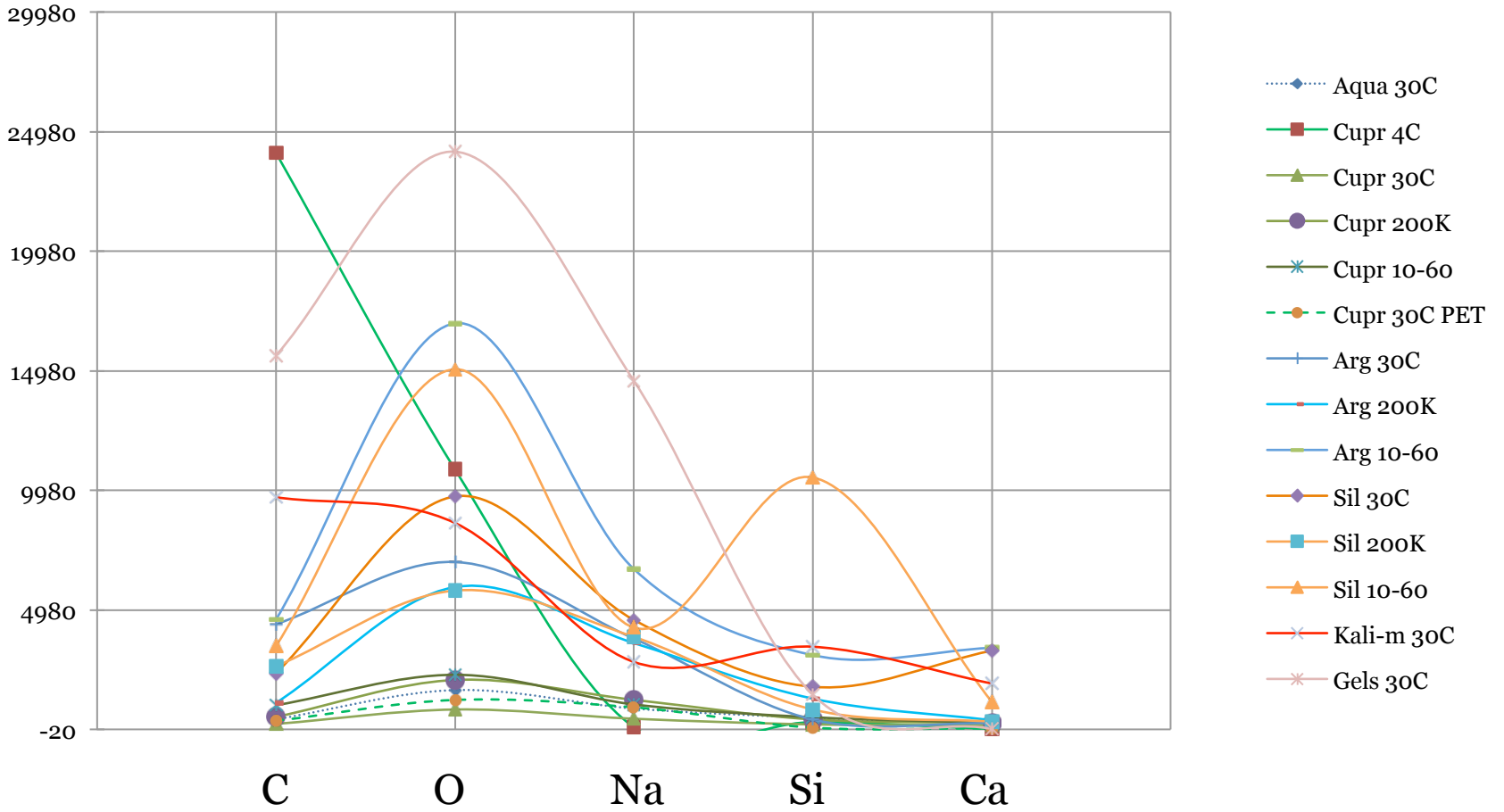
EDX

- Cuprum metallicum.

EDX =

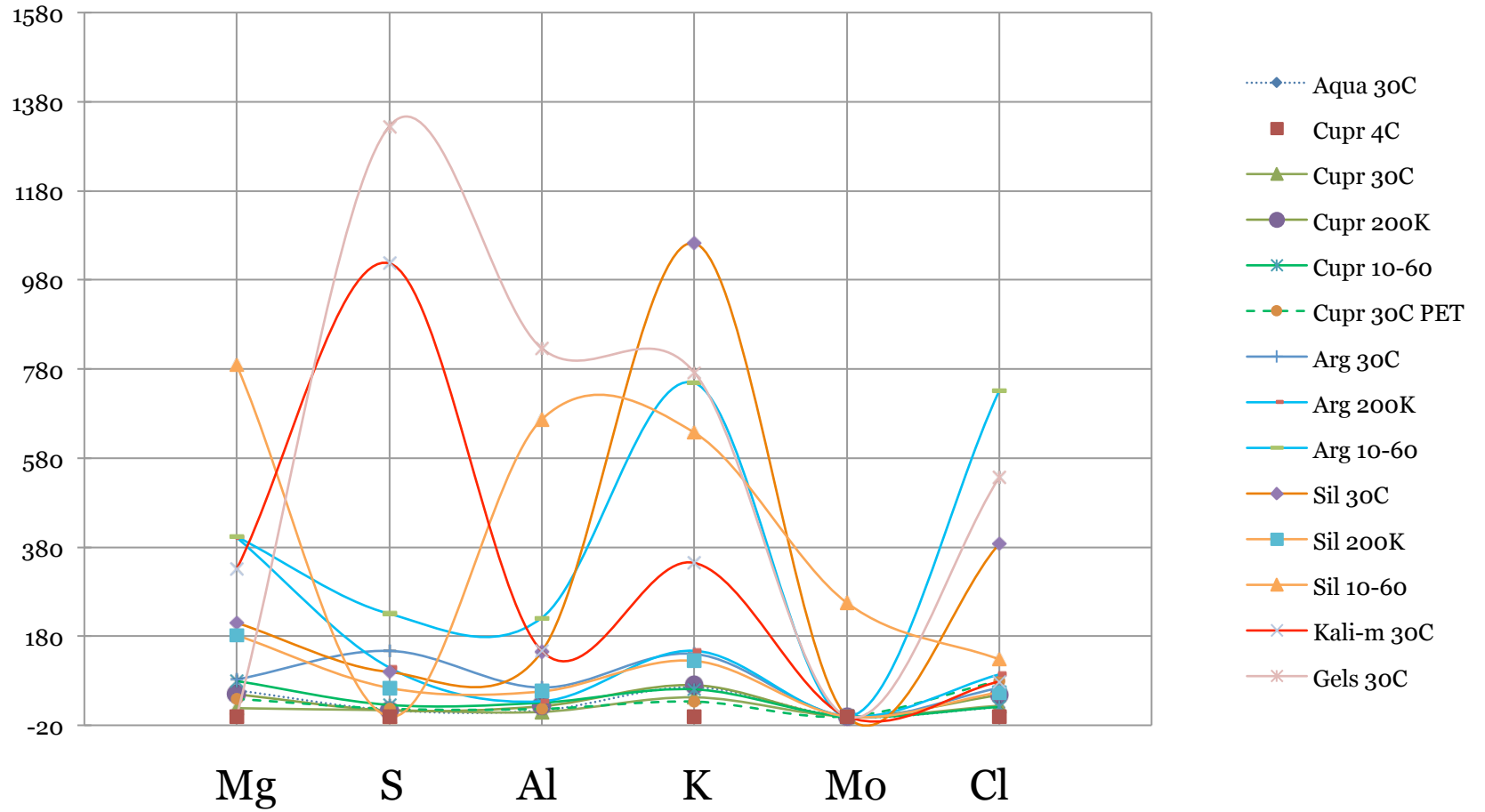
Electron Microscopy with X-ray microanalysis is allowing the chemical analyze of the observed material.

Identified chemistry in dilutions/potentizations (atom% * atomic mass * µg quantity) for the 5 most concentrated atoms in the different preparations.



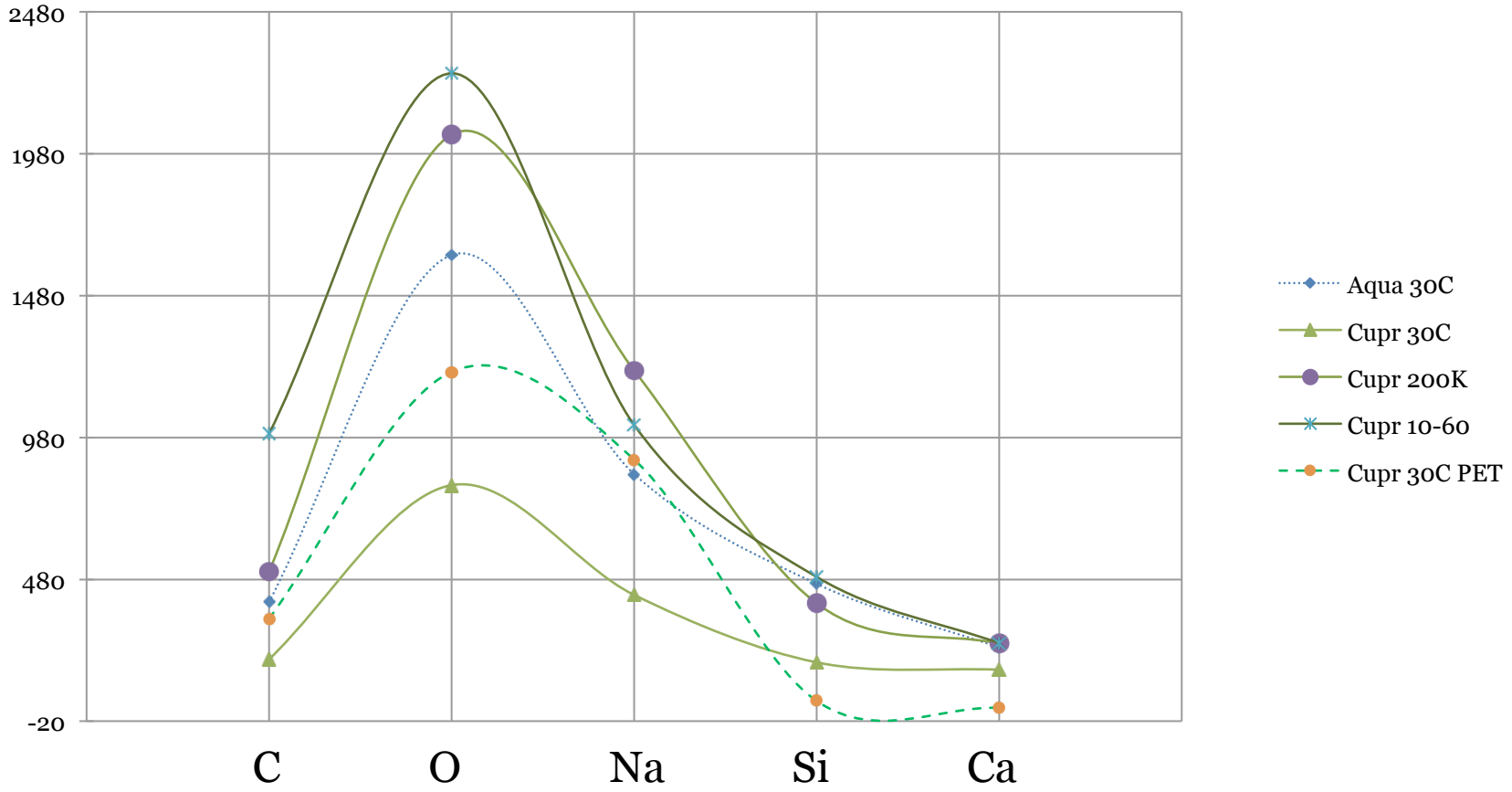
There is a difference in chemistry between the different samples. The proportion of Carbon, Oxygen, Sodium are always high, Silicium and Calcium are also good discriminant factors. Cuprum 4C is almost pure sugar ($C_{11}H_{22}O_{11}$) and real values are about 9000 times higher than presented here. At this scale, the different dilutions/potentizations of copper are not easily discriminated from each other but it is easy to discriminate from other metals or salt or plant. For silver and silica the differences between dilutions/potentizations are clearly expressed.

Identified chemistry in dilutions/potentizations (atom% * atomic mass * µg quantity) for 6 lower concentrated atoms in the different preparations.



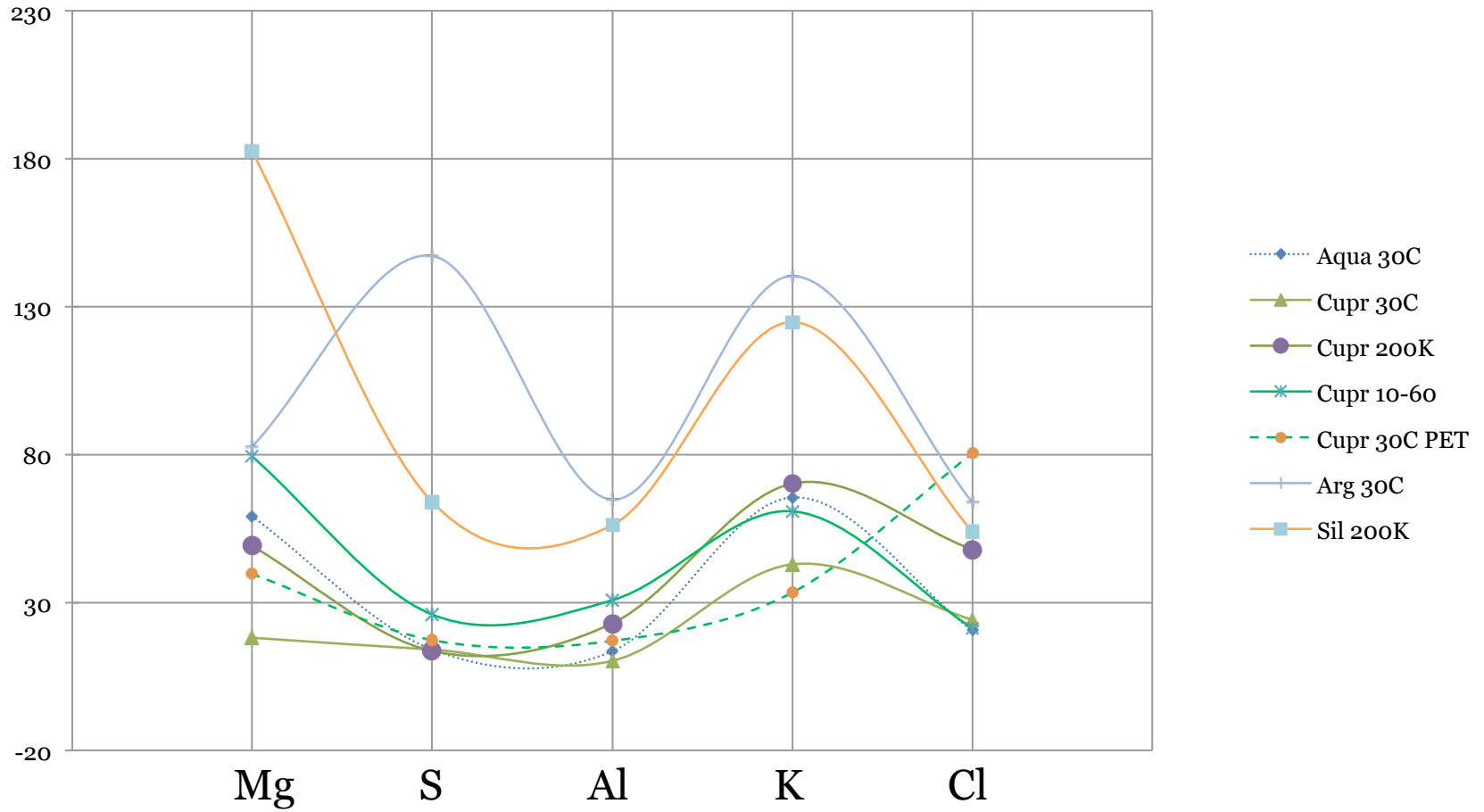
Also for lower concentrated atoms, there is a difference in chemistry between the different samples and are good discriminant factors. At this scale, Cuprum dilutions/potentizations chemistry is not as easy to discriminate between each other for these atoms but easy to discriminate from other preparations.

Identified chemistry in dilutions/potentizations (atom% * atomic mass * µg quantity) for 5 most concentrated atoms in the copper preparations and water control (comparable scale).



There is a difference in chemistry between the different samples. The proportion of Carbon, Oxygen, Sodium are always high, even if Silicium and Calcium are not as high concentrated, they are all good discriminant factors. Cuprum 4C is almost pure sugar ($C_{11}H_{22}O_{11}$) and real values are about 9000 times higher and therefore not presented here.

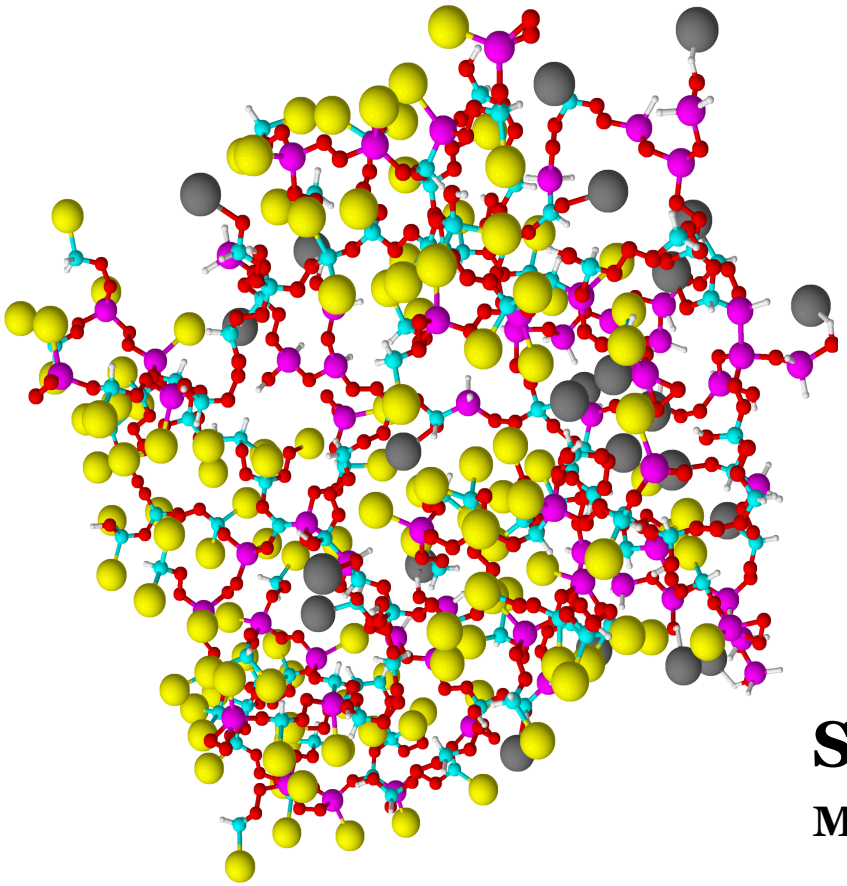
Identified chemistry in dilutions/potentizations (atom% * atomic mass * µg quantity) for 6 lower concentrated atoms in the preparations expressed at the low comparable scale.



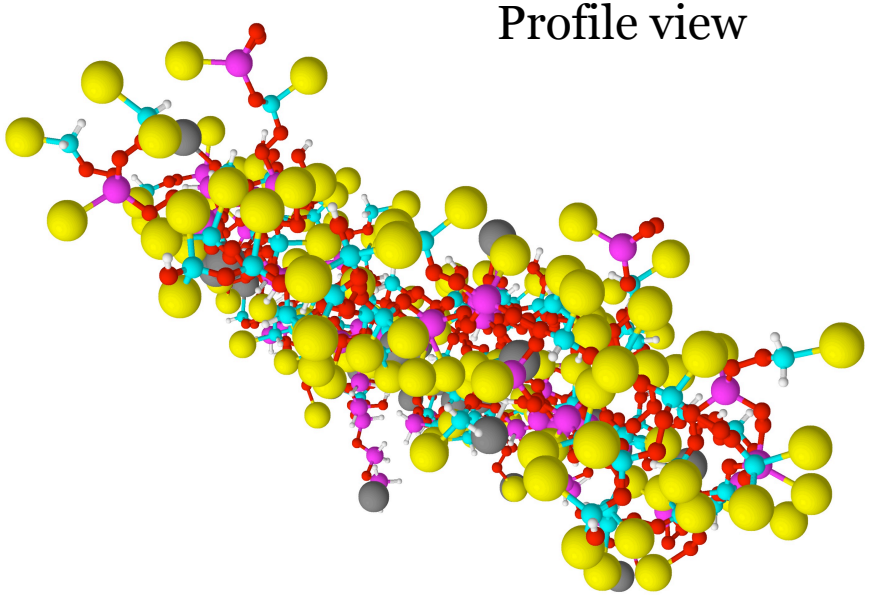
Also for lower concentrated atoms, there is a difference in chemistry between the different samples and are good discriminant factors. At this scale, Cuprum dilutions/potentizations chemistry is not as easy to discriminate between each other for these atoms but easy to discriminate from other preparations.

Possible modelisation of these particles (100 smaller than in reality)

C112 H164 Ca24 Na 128 O352 Si64: Lmin 1,4nm; Lmax 1,4nm; Thickness 0,6nm.
Yellow = Na; Red = O; Magenta = Si; Blue = C; **Grey = Ca**; White = H.



Profile view



Skeleton=SiO_2+C=thin plates

More compact model if Si/C decreases.

Conclusions SEM/EDX (1)

- For Cuprum 4C the expected quantity of dry material was almost completely collected. In the highest dilutions/potentizations theoretically unforeseen dry material was collected.
- There are indeed big differences in the amount of collected material depending on the performed dilution/potentization process but also according to the different soluble or insoluble stocks used. In the soluble plant extract (Gelsemium) there is the biggest quantity of material (36 times more than in copper for the same potentization 30C).
- Compared to other metals, copper is the stock that gives the smallest amount of residual dry material.

Conclusions SEM/EDX (2)

- The presence of this material demonstrate that the used step by step process (dynamized or not) is not a simple dilution process. For all stocks, after a simple dilution, there are always significant larger quantities of dry material collected in comparison with the potentized samples.
- The lyophilized dry material obtained observed by SEM/EDS, allowing a detailed view of the nature of the obtained lyophilized dry material, produce remarkable images. If we compare the nature of the material, it is possible to discriminate the shapes not only between a metal, a salt and a plant but also between different metals and between different dilutions/potentizations process

Conclusions SEM/EDX (3)

- The chemistry of the materials, determined by EDS, shows that this material is not composed of all original molecular compounds of the MT. We did not find copper or silver in the samples; nevertheless, there is a specific composition for each of the samples, stocks and/or dilution/dynamizations.
- The proportion of the different atoms results in a specific chemical profile. Because of the absence of any particles in the used deionized pure water (NTA), the presence of these atoms can only be justified by an interaction between the original stock, the used glass containers and the deionized water.

Conclusions SEM/EDX (4)

- The specificities between different samples force us to also recognize an impact of the original stock all along the dilution or potentization process. A simple dilution is not a potentization and a difference exists between the C, K potentization processes and controls.
- When using PET containers for the potentization of Aqua pura 30K no significant particles can be observed but in the potentized Cuprum metallicum 30K in PET container, specific particles are observed. This fact confirms the role of the stock during the potentization process. The percentage of silica is the highest in the Silicium 30C.

A comprehensive approach

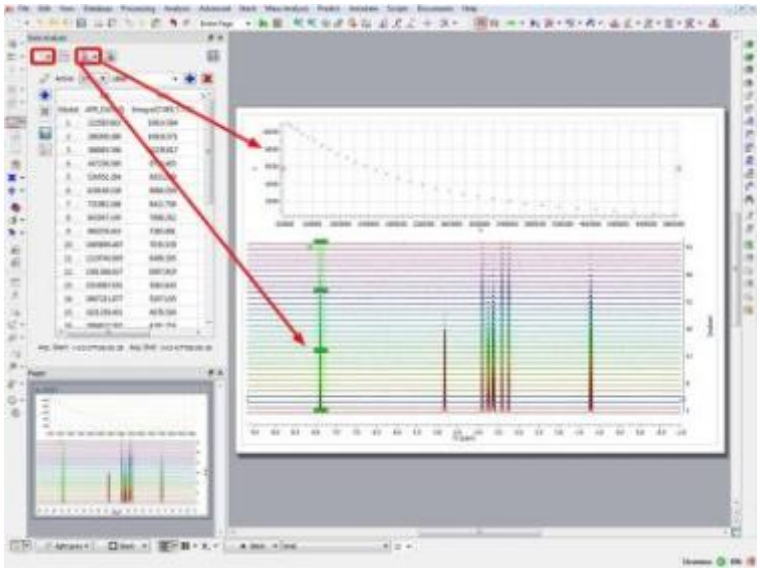
✓ Nano particles search

✓ **Solvent (water) behaviour**

✓ Electrons behaviour

NMR

- NMR: Prof. Luce Vander Elst.
- Nuclear Magnetic Resonance Spectroscopy. Calculation of Relaxation Times 1, 2, for the full range of dynamization up to 30CH.
- Aim: Collection of all values for Cuprum and Gelsemium.



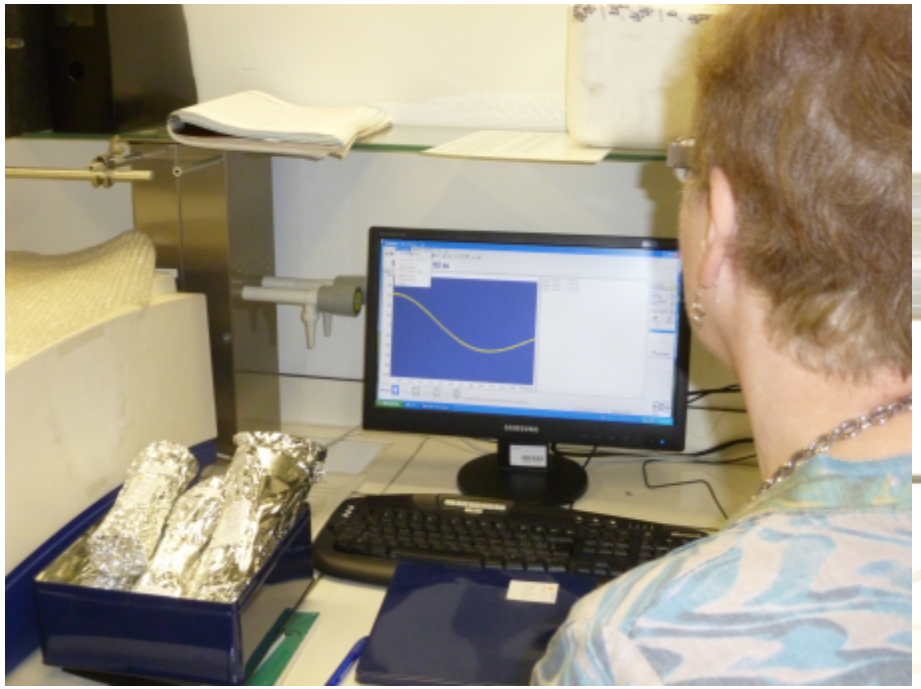
NMR

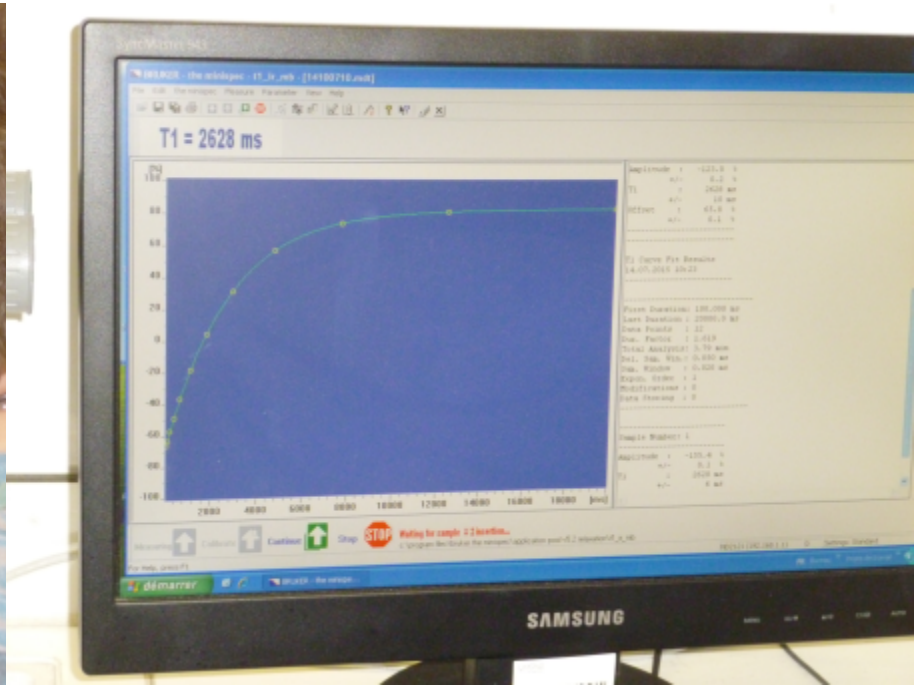
- **NMR Relaxation times are correlated to the water behaviour.**
- **Aim: statistical discriminant analyse of NMR signals from different homeopathic remedies and different dynamizations versus 3 controls : pure water, dynamized lactose (for triturated stocks), dynamized water and simply diluted stocks.**

NMR

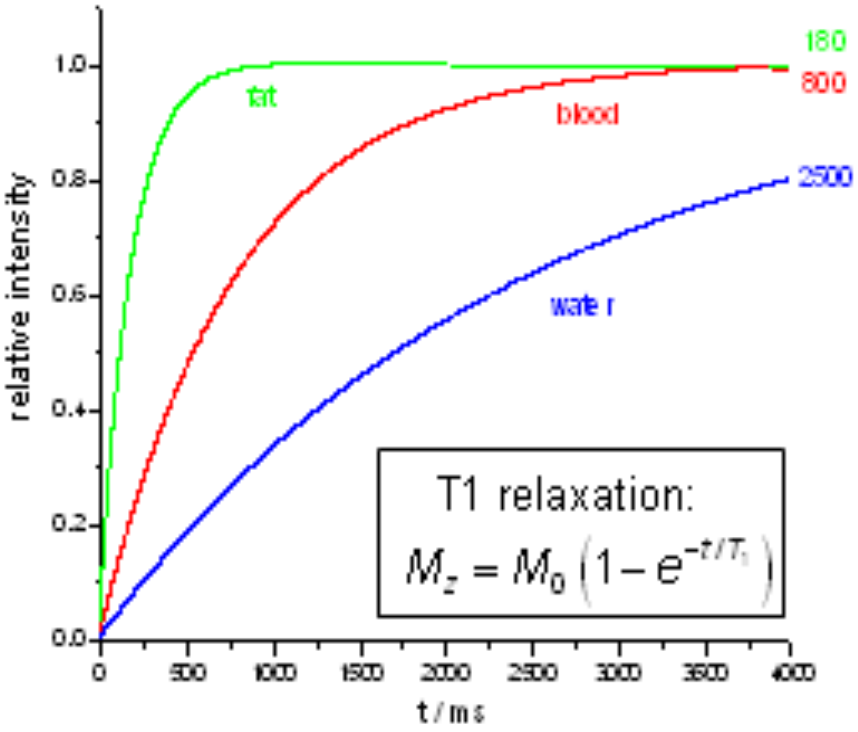
NMR

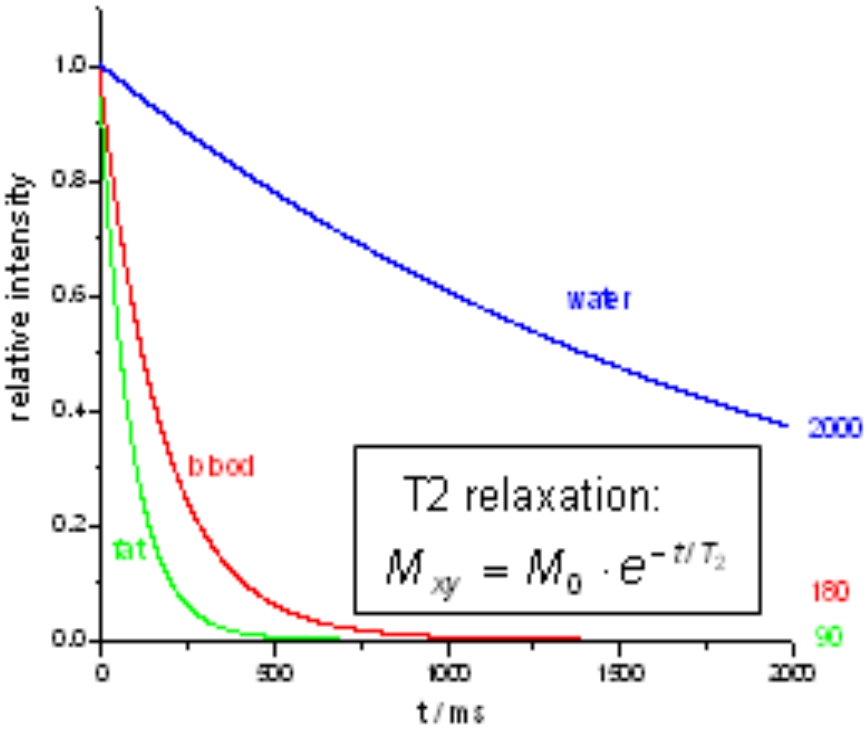
Daily calibration of measurement tool.

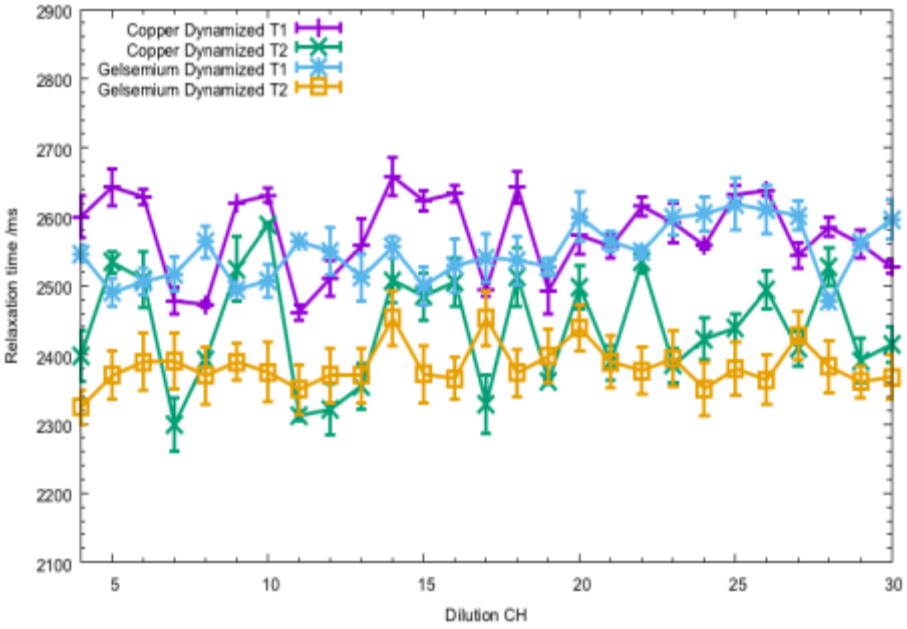


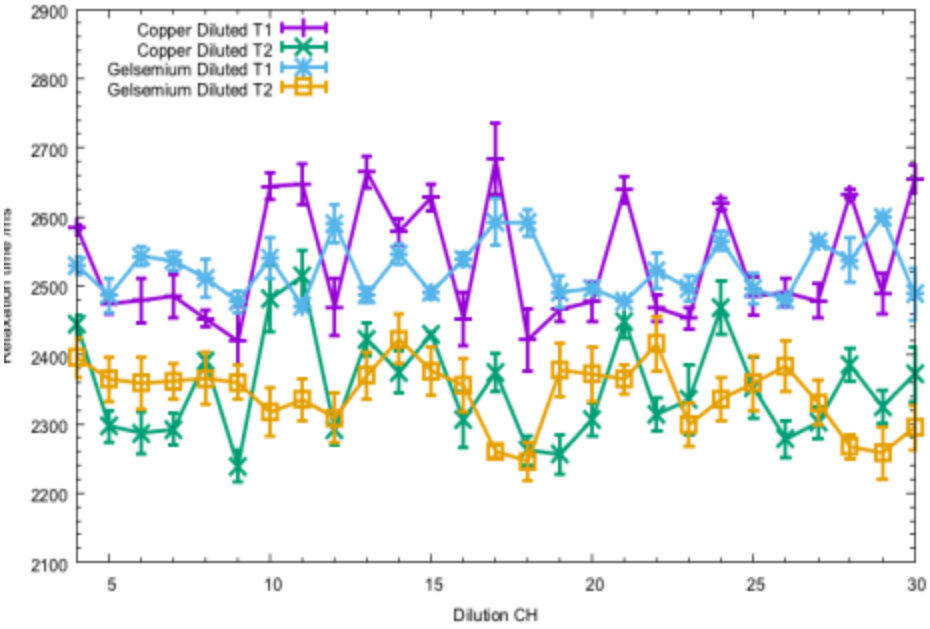


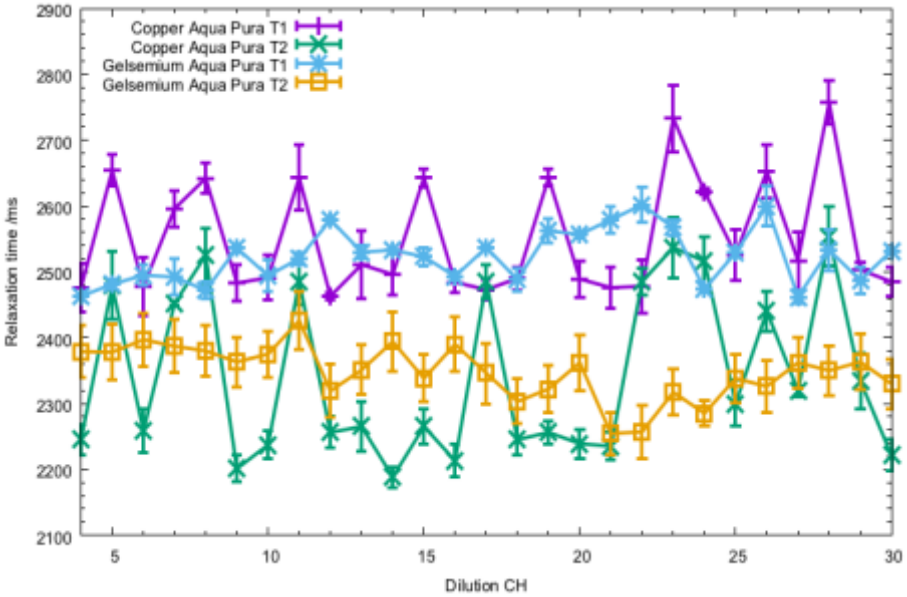
NMR

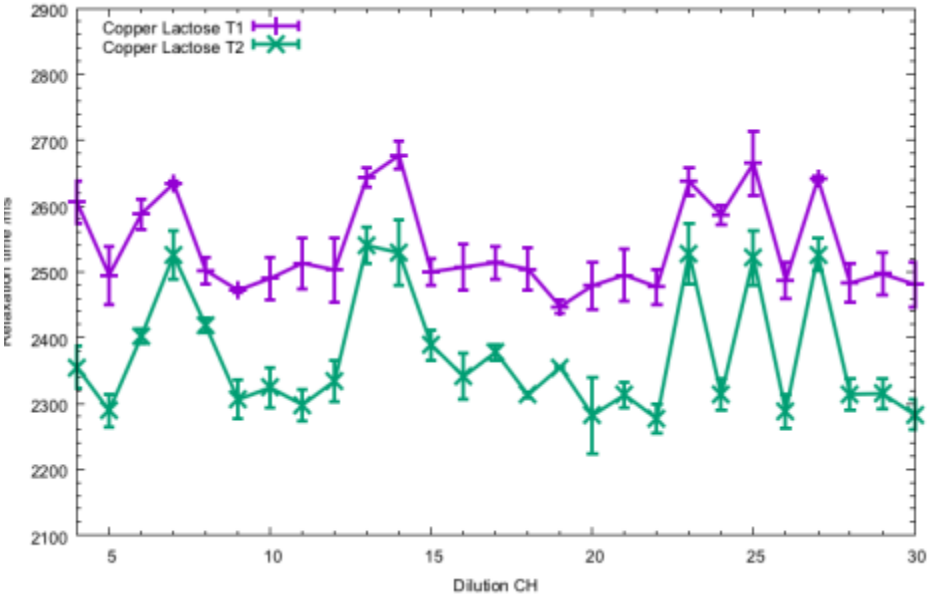

relative intensity
t / ms
fat
blood
water
180
800
2500
T1 relaxation:
$M_z = M_0\left(1 - e^{-t/T_1}\right)$


relative intensity
t / ms
water
blood
fat
2000
180
90
T2 relaxation:
$M_{xy} = M_0 \cdot e^{-t/T_2}$


Copper Dynamized T1
Copper Dynamized T2
Gelsemium Dynamized T1
Gelsemium Dynamized T2
Relaxation time /ms
Dilution CH


Copper Diluted T1
Copper Diluted T2
Gelsemium Diluted T1
Gelsemium Diluted T2
Dilution CH


Copper Aqua Pura T1
Copper Aqua Pura T2
Gelsemium Aqua Pura T1
Gelsemium Aqua Pura T2
Relaxation time /ms
Dilution CH


Copper Lactose T1
Copper Lactose T2
Dilution CH

NMR

After these measurements a question arise :
« Are these values specific and as such allowing to discriminate the medicines between each other or are they aleatory values? ». To answer this question, statistical analyses are needed. During the session after the break the response to this question will be given.

A comprehensive approach

✓ Nano particles search

✓ Solvent (water) behaviour

✓ **Electrons behaviour**

EPA

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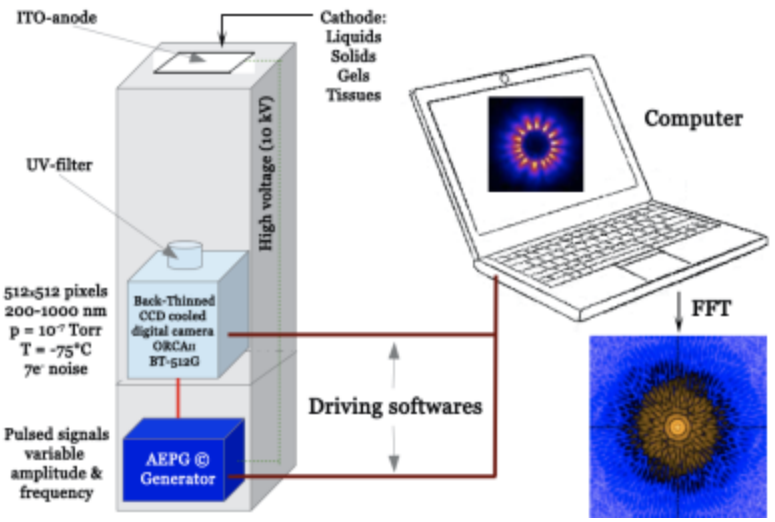
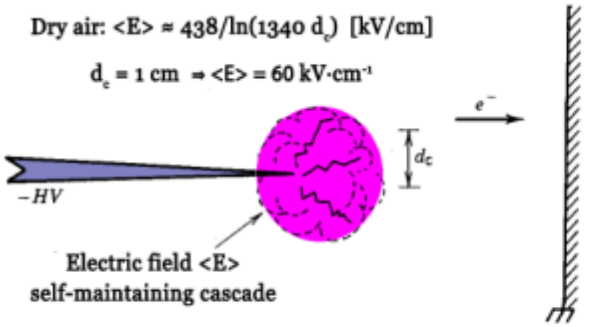
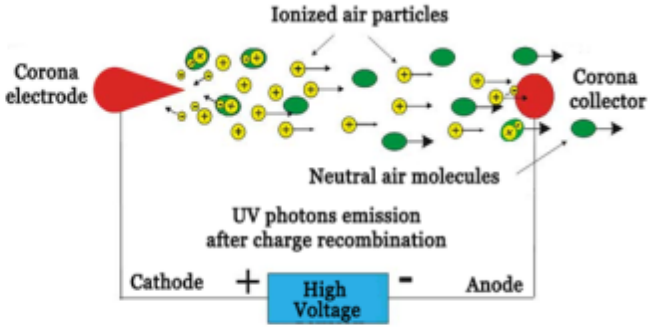
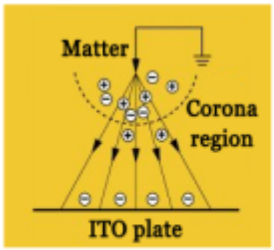
- Electro Photonic Analyse of any “material”
- Aim: precise discrimination of each remedy but also of the dynamizations of a same stock. Allowing to test the different methods and number of dynamizations; top, midden, bottom pipetting.
- Very sensitive and specific analyse.
- One drop or one pilule is enough!

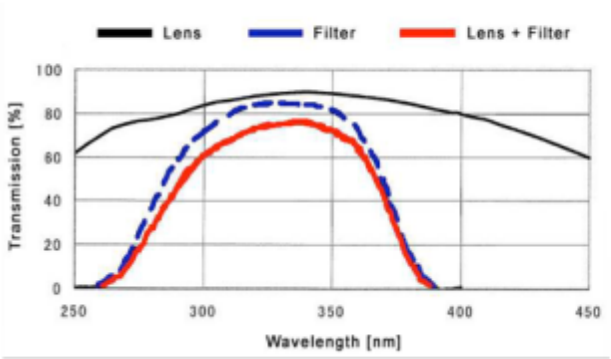


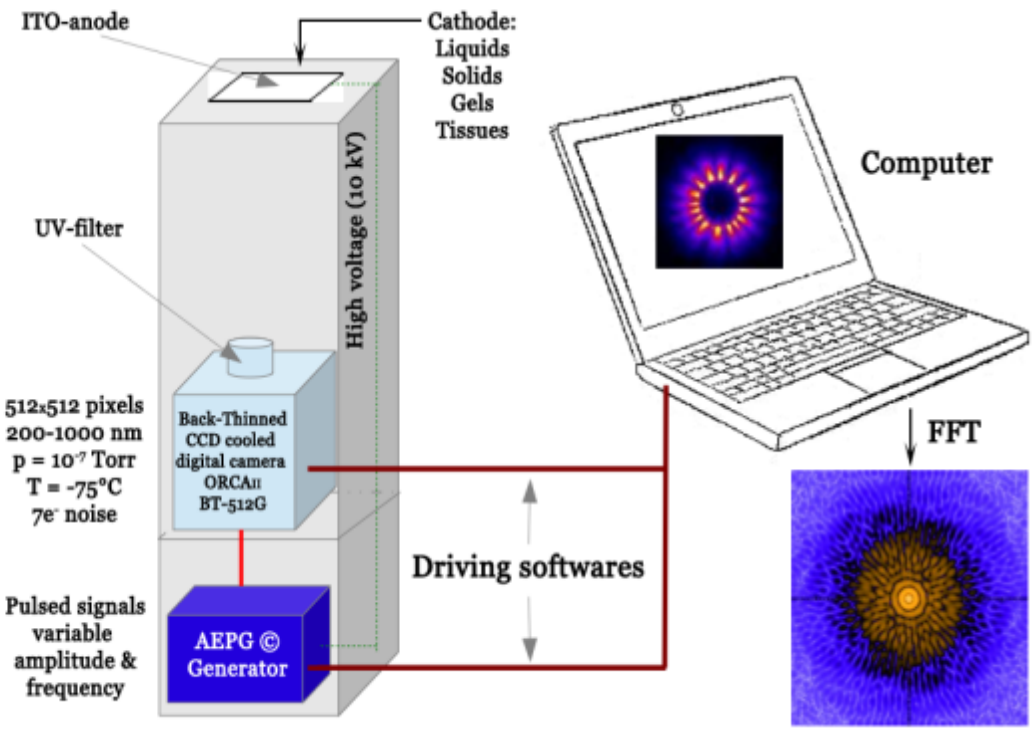
EPA


Dry air: <E> ≈ 438/ln(1340 d_c) [kV/cm]
d_c = 1 cm ⇒ <E> = 60 kV·cm⁻¹
e⁻
d_c
−HV
Electric field <E>
self-maintaining cascade


Ionized air particles
Corona electrode
Corona collector
Neutral air molecules
UV photons emission
after charge recombination
Cathode
+
High Voltage
-
Anode


Matter
Corona region
ITO plate


Lens
Filter
Lens + Filter
Transmission [%]
100
80
60
40
20
0
250
300
350
400
450
Wavelength [nm]


ITO-anode
Cathode:
Liquids
Solids
Gels
Tissues
UV-filter
High voltage (10 kV)
512x512 pixels
200-1000 nm
p = 10⁻⁷ Torr
T = -75°C
7e⁻ noise
Back-Thinned CCD cooled digital camera ORCAII BT-512G
Pulsed signals variable amplitude & frequency
AEPG © Generator
Driving softwares
Computer
FFT

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- April 2016: 607 images : 3 for 175 liquid samples and 1 for 82 impregnated pilules (size 6) samples including several controls.
- Liquids one drop of 15µl suspended at the top of the pipette tip and in contact with the electrode (10000 Volts, 400 Hz). When electric stimulation stop the emitted light is photographed.
- For globules the electrode is in contact at the top of the pilule (11000 Volts, 120 Hz).

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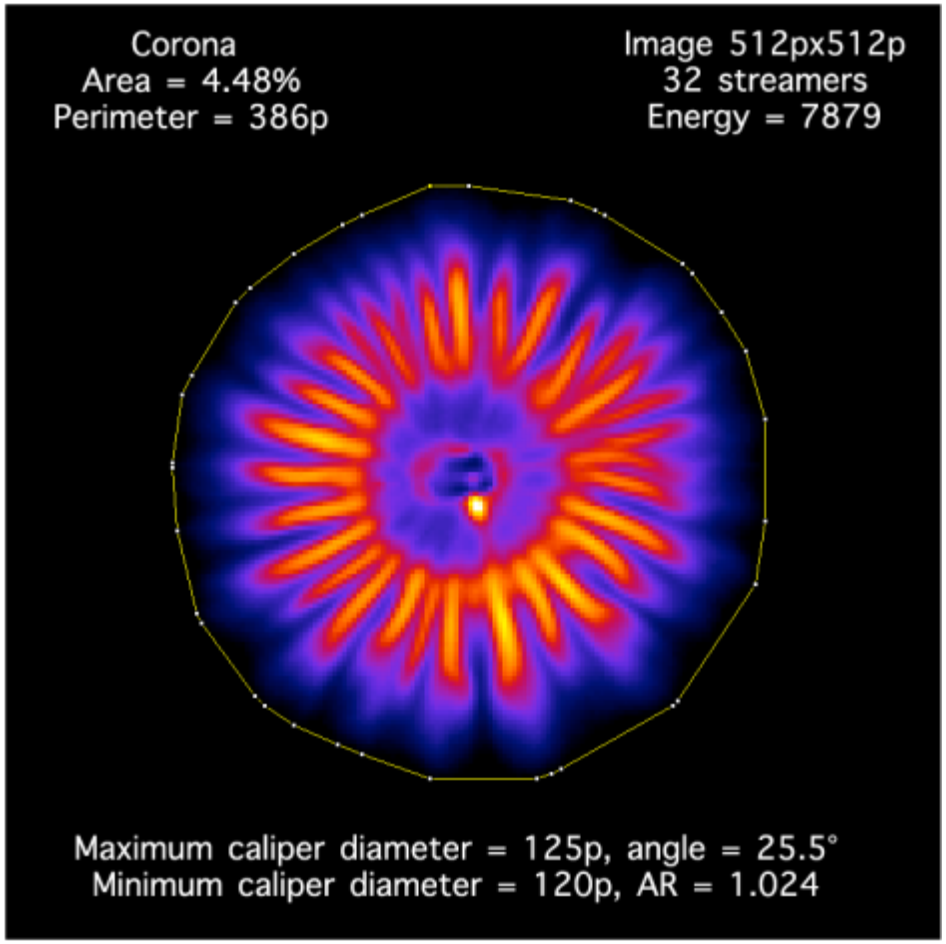
EPA
Cuprum 4CH



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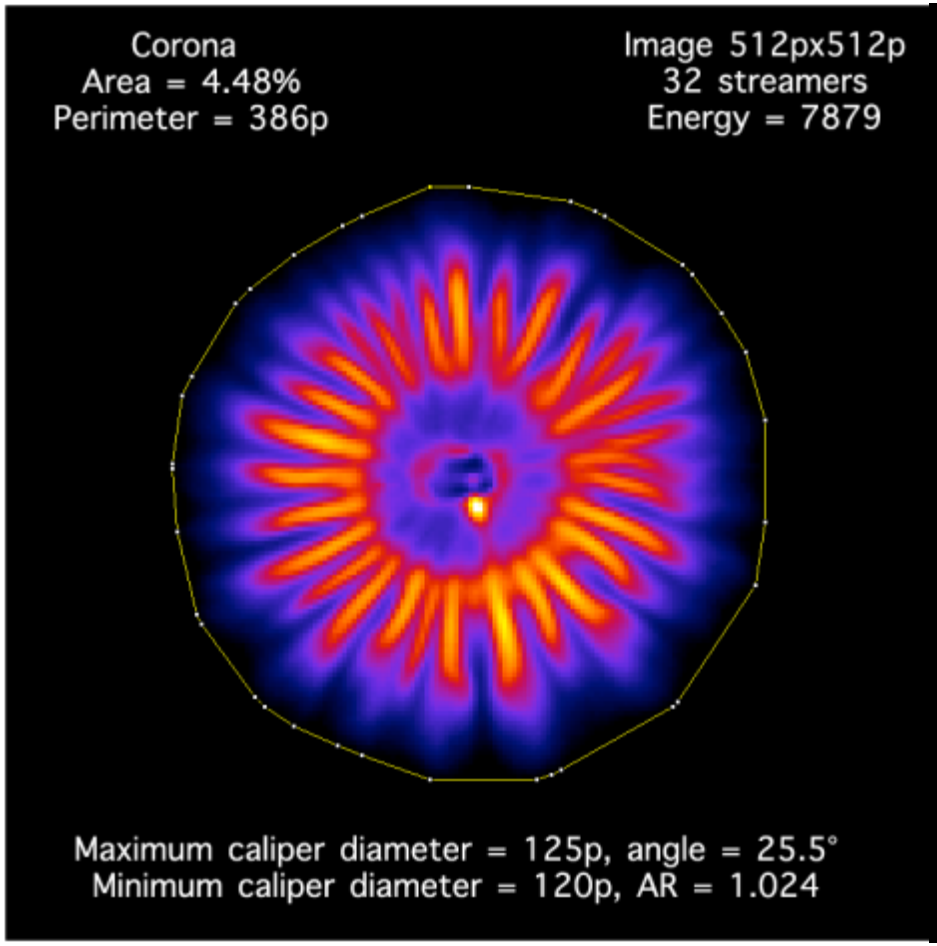
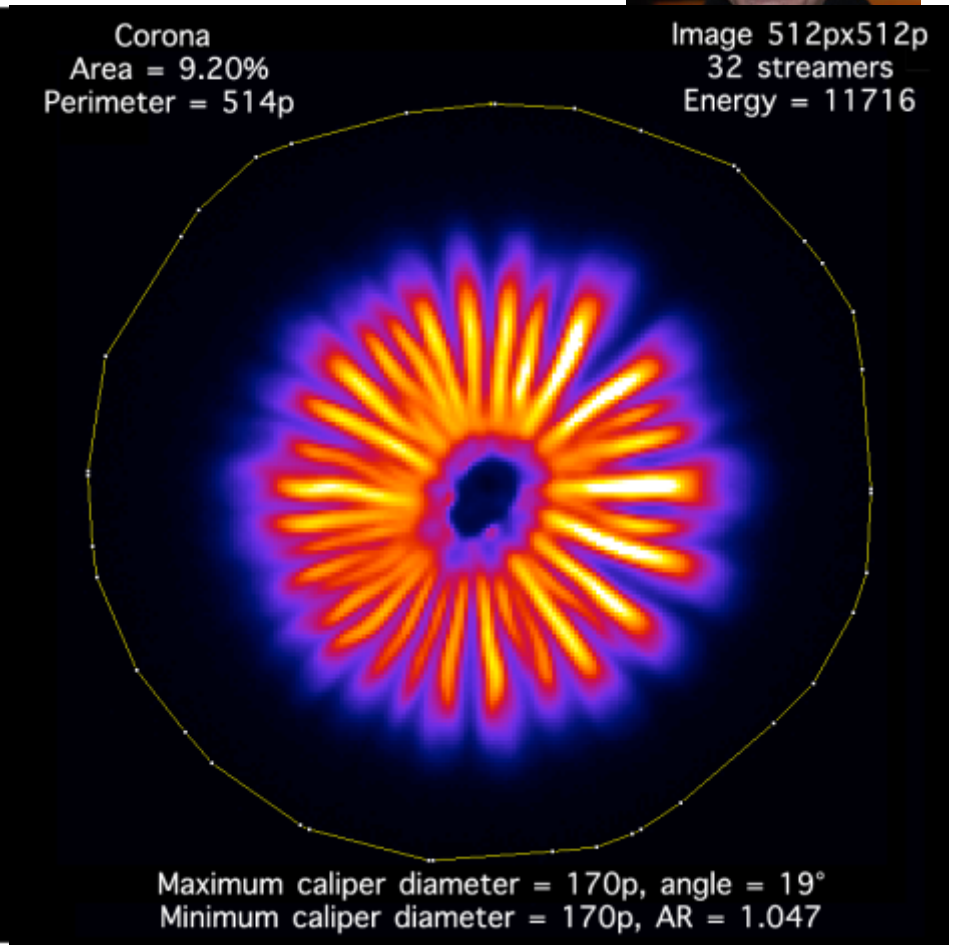
EPA granules
Cuprum 4CH



Gelsemium 4CH



EPA

After these measurements here also a question arise : **« Are these images and mathematic analyse of them, specific and as such allowing to discriminate the medicines and potentizations between each other or are they hazardous? »**. To answer this question, appropriate mathematical analyses are needed. During the session after the break a response to this question will be given.