Verification Report on nuclear transformation experiments of Proton21. Verification measurements in different laboratories in Belgium.

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Verification report on the experiments of Proton21

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Approach to verification

With the team of experts we have witnessed and participated in the actual running of experiments in the laboratories of Proton21. After an initial scientific briefing by Dr. Stanislav Adamenko we were given a visit to the actual experimental setup in Kiev. During this visit we received extensive explanations of the way the experiments were actual running.

The verification team of experts from Europe participated afterwards in the experiments. The samples were prepared in the most safe and pure conditions under our control. The samples were then introduced into the vacuum chamber in our presence. For the actual "shot" the verification team was locked in the control room for safety reasons. From the control room, through a control window we could actually observe the light flash of the discharge that took place.

After all security measures were met we were allowed back in the core laboratory room where we witnessed the offload of the samples. In our presence the vacuum was broken and the sample was taken out of the RVD (Relativistic Vacuum Diode) in our presence. While applying all necessary measures for clean transport, the sample was then taken to the analysis room for first visual inspection. First visual inspection of the sample showed the typical effects of the application of the discharge in the RVD : the "flower shaped" structure, positioning of the remnants of the transformed material on the detection screen. Since there is no analysis equipment close to the analysis room, the samples were subsequently stored in special containers and transported to Europe for further analysis.

Extensive analysis has been performed on a variety of samples in totally different circumstances, in different laboratories, using different equipment (or similar equipment but in different laboratories), the high level results of which are clarified further on in this paper. All the results were shown to independent experts who confirmed the correctness of the interpretation of the results. This work is currently further elaborated.

Experimental analysis techniques used are visual microscopy, SEM/EDX, AES, TOFSIMS. The analyses were always carried out by different very experienced operators who know their instruments very well. All the operators acted under the supervision of the responsible professors of the laboratories.

Results of the measurements on the Proton21 samples in European laboratories.

There is no doubt; experiments have shown that nuclear transmutations take place whatever the theoretical explanation could be.

Transmutations :

Let us look at the experiments. Samples made from very pure metal are exposed and the treatment results in a micro-explosion of the target as can be seen directly under an optical microscope. During the explosion material is ejected and such ejected material has been not only detected on the ground of the morphology, but also intensively analysed by many methods, one of them being the microprobe X- ray analysis. The x-ray energies are very characteristic for one element; consequently if one detects x-rays with an energy corresponding to a particular element, which is not the element of the starting material, it is a clear sign that initial material has been changed into another element. Such a change requires that the number of protons and neutrons is changed. It needs a transmutation at the nuclear level.

No doubt, there is not any other explanation except for a weak criticism. Could it happen that before, during, or after the micro-explosion one would have a precipitation of contamination with the different elements, which are detected by X-rays ?

Such critical arguments can be waved away or at least strongly weakened by the correct interpretation of the existing experimental results.

Let us summarize our arguments against such criticism:

1) Extreme care was taken in all stages to prevent any contamination from the exterior world. Critics could ask if the precautions are indeed good enough and therefore this answer alone is not sufficient, but one can give better arguments.
2) On a picture of the electron microscope of the accumulation screens, one can distinguish very clearly the ejections of material due to an explosion in top of the target. The argument is that the “new” formed elements are found in these ejected material and not elsewhere. Conclusion : they were formed by the process which provoked the explosion.
3) The reliability and reproducibility of the process is secured in different ways.
   A)The experiments have been done and overdone on a large number of samples.
   B) With different target and collecting-screen materials.
4) The analysing technique is now verified by different laboratories in the frame of a verification process. However, in order to ensure complete unpredjudiced evaluation, the operator was not informed in advance of what could be expected. The elements to be found were left to his surprise and his skills to recognise an element.

As a conclusion: it is now verified that “new “ elements are found in the processed samples and collecting screens in amounts that are not found in the initial material. These results are reproduced by three completely independent laboratories and must be considered as an experimental fact, which cannot be denied whatever theoretical model one could advance.

The only weak point left over, could be the answer to the question if perhaps some hidden source of contamination could really be completely excluded. In view of the extreme importance of the previous conclusions and the tremendous perspectives it offers, one must wave back these arguments and there is a way to do it: isotope abundances.

The main idea goes at follows:
The nucleosynthesis by which the elements which we find on our planet is an supernova explosion which ejected big quantities of material as star dust. By gravitation the dust collapsed to form finally the solar system. Thus we are stardust and the synthesis of elements was performed and finished before our planet was created and as a consequence elements on earth have a very characteristic isotope abundance distribution; it can be found on most of the chart of nuclides there are some small deviation for some elements which are also formed by decay of very very long lived nuclei like for example U 238.

But for practically all elements the relative isotope abundances are independent on the finding place. And the spectrum of relative abundance is thus a signature of an element on earth.

In fact it is a signature of the particular nucleosynthesis of the star-dust that collapsed finally to be our material on earth. If in the laboratory of proton 21 another nucleosynthesis is produced in a much different way, we can reasonably expect that the elements formed in that process may have a different distribution of isotopes.

Thus if the “new” elements are found with an isotope abundance that differs from the one we find on earth, there is no doubt left: nuclear transmutations took place. If it would be contaminations, the isotope abundances must be the same as for the same element found on earth. If luck would not be on our side and we find the same isotopic abundances as on earth it does not prove that the new elements are contaminations because some believe that the conditions of nucleosynthesis will always end up in the same isotope abundances.

However experiments published by the proton 21 group show isotope abundances of different elements which deviate very strongly from the natural ones and we have thus all reasons that the measurements on the isotope abundances will deliver a proof of nuclear transmutations: the ultimate experimental proof which cannot be denied.

Energy.

On earth we try to gain energy from nuclear transmutations of different kind. From considerations of binding energies, we know that light nuclei will produce energy when they fusion to form one bigger nucleus but heavy nuclei will liberate energy by splitting up in two or more lighter ones. The difference of binding energy is due to a balance of strong attractive forces between nucleons against coulomb repulsive forces between protons. The strong attractive forces are very short ranged and thus dominant for light nuclei. And thus one can gain energy by making bigger nuclei by fusion of light ones. But once the resultant nucleus has something like more than 60 nucleons or 30 protons, the nucleons on the inside cannot attract the outer ones because of the limitation due to the short range of strong forces. If one considers bigger nuclei the repulsive but long ranged forces between protons will pull the protons apart and the nucleus could liberate some coulomb energy by fission in two lighter nuclei. This balance of strong against coulomb energy explains the opposite behaviour of light against heavy nuclei, fusion against fission. But in the scenario of minimising the energy, one could conclude that heavy nuclei would spontaneously fission while light nuclei would fusion; in that scenario neither heavy nor light nuclei could be stable and exist and our world would contain only a few elements, for instance, iron, cobalt and nickel. Quod non!! We forgot a very important player, the coulomb barrier! But the name is badly chosen and confusing because anyone could reason that it is just the coulomb forces while we would think that they make the nuclei instable because of the mutual repulsion of protons.

How can we invoke a “coulomb barrier” in order to explain the stability? Let us, in our imagination, bring two bare nuclei close together. At long and intermediate distance the strong forces don’ t work yet because the distance is too large and the coulomb repulsion try to push the nuclei away and will succeed to avoid the collision except if the relative kinetic energy is big enough to overcome the coulomb repulsion.

In the case of enough kinetic energy the collision or near collision brings the nucleons of the one nucleus close enough to have them attracted by strong interaction to the nucleons of the other nucleus. In that case the two nuclei will fusion under this strong attraction. With less kinetic energy the two nuclei will avoid collision and fusion because of the coulomb repulsion.

In order to get enough kinetic energy one can accelerate one species and smash it on the other one. Or one can heat the two species to such a high temperature that the gas-kinetic energy of some nuclei is high enough to bring them in a fusion collision. There must be a minimum of relative kinetic energy for fusion to occur. A collapse of light nuclei by fusion will not occur. The fission of a heavier nucleus in two lighter ones will not happen because to split a heavier one in two lighter ones one must fight the strong interaction that keep the nucleons close together in the heavy nucleus. One must break some strong bounds in order to separate the two lighter nuclei to such a distance that the strong interaction does no more act; this separation process needs energy but once it is done the long ranged coulomb forces will accelerate the two light nuclei away from each other. Fission occurs but not spontaneously because the first push has to be given. In a nuclear power reactor the first push is given by the dropping

of a neutron in the heavy nucleus, liberating the binding energy of one nucleon, about 6 MeV, enough to initiate the fission process.
Thus the catastrophic inferno, in which light nuclei would fusion and heavy ones would fission, does not occur. But if we would have a bottom to switch off the coulomb forces, the whole world would fusion into one gigantic nucleus. If that bottom would switch off the strong interactions and not the repulsive coulomb ones, then everything would split up in a cloud of protons and neutrons. So the whole existence is due to a good balance of forces; nuclear forces, less strong or with shorter range, would make fusion more difficult and make heavier nuclei unstable; less coulomb forces would make fusion more easy but it would increase the stability of heavy nuclei

In order to liberate energy from nuclear transmutation we would have interest to decrease the coulomb repulsion but nature does not provide such a regulating bottom. Nevertheless we are not completely “lost” because we can imagine of changing the total electric charge of a nuclear sphere by adding negative charges to the protons.

In the first place we could think of electrons, but electrons and protons make atoms in which the electrons balance their kinetic energy with the potential energy and the electron density at the nuclear sphere is very small, negligibly small and we can change it only a very little bit by changing exterior parameters like pressure, chemical binding etc.

It is not sufficient but one speculates that fusion of tritium and deuterium would be somewhat easier when embedded in metals rather than in gaseous state. Despite the idea is rather impractical for obtaining fusion energy, it inspired the Proton21 team.

They claimed that if one could increase the electron density in a solid from the conventional 10^{23} electrons per cm^3 the charge of to more than 10^{30}, the electron density at the nucleus would be so big that it nearly compensates the charge of the protons. In that case the coulomb forces between nuclei decrease and fusion can be expected to become easy, producing heavy nuclei, even superheavies, and liberating a lot of fusion energy.

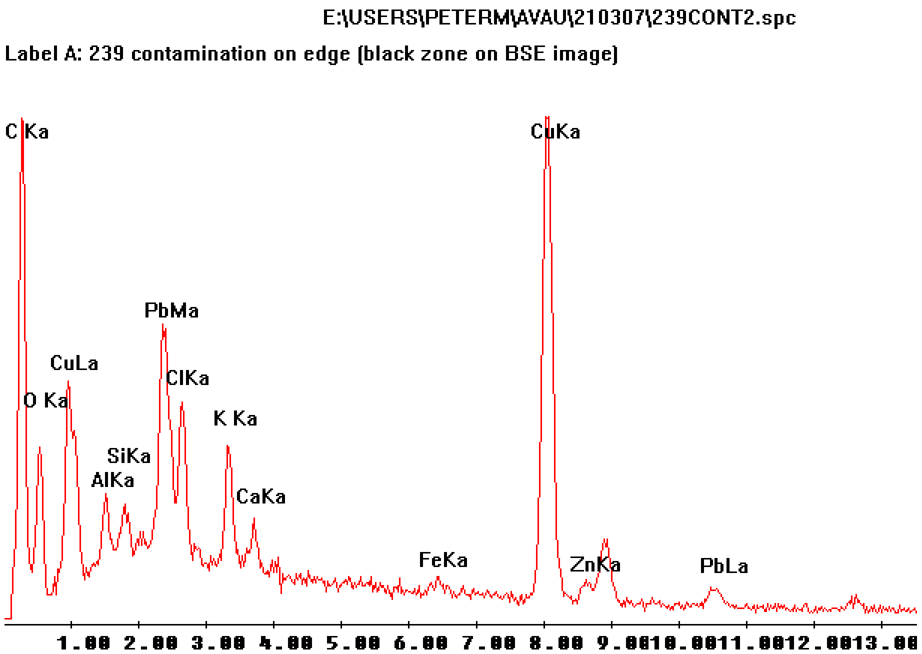
It opens tremendous perspectives for applications but it shift the problem to the obtainment of such electron densities in macroscopic volumes.

The Proton21 team crashes the electrical charge of large condensers on a pin anode; this way they obtain a plasma layer on the surface with a very large electron density. Due to the increased coulomb forces between electrons and protons, the matter density and the binding energy of this plasma is bigger than outside the layer, creating surface forces directed inwards the layer. The geometry of the layer is spherical or cylindrical. The inner surface is smaller than the outside surface and thus the resultant force on the layer is directed to the centre. Under this force the plasma layer moves inwards and collapses at the centre. In the plasma, the nuclei can fusion, resulting in the nucleosynthesis of other elements.

In this process energy is released, provoking a little but spectacular nuclear explosion in or near the centre of the sample. By the explosion material melts and is ejected. The ejected material contains the relics of the nuclear transmutations

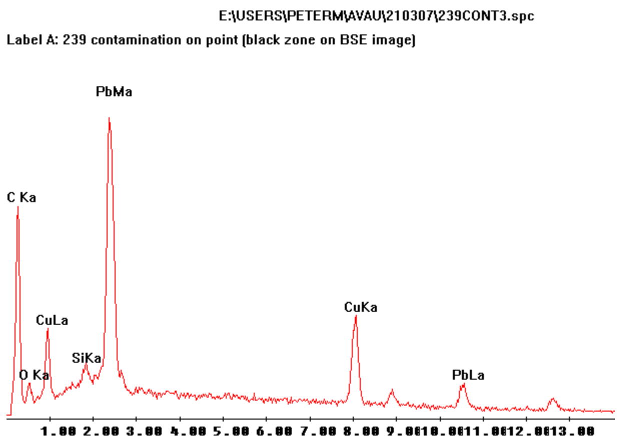
Experimental evidence on the samples provided by Proton21.

The following spectrum was obtained.



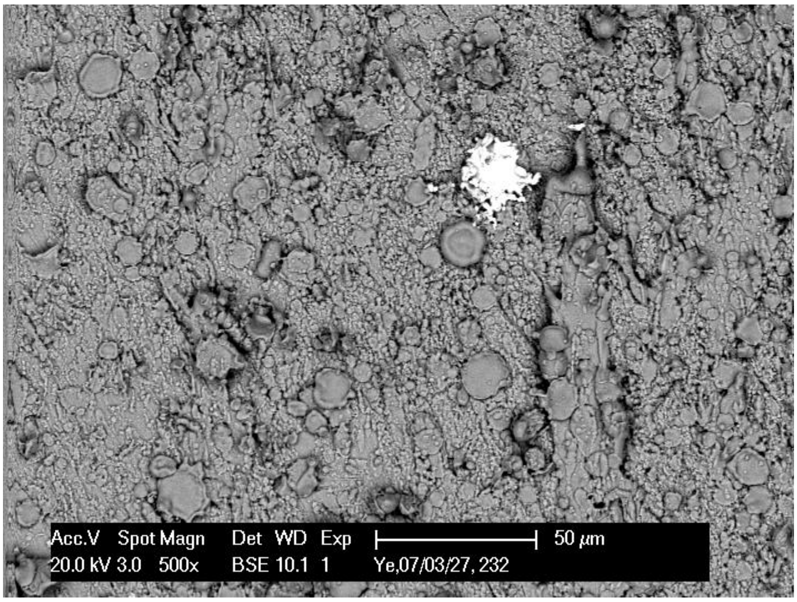
Without any doubt besides Cu and Pb (evident), there is undoubtedly the presence of C, O, Al, Si, K, Ca, Fe, Zn… Repeated verification with the operator proved the same conclusion. The elements are there in macroscopically quantities so that they cannot be attributed to the presence of impurities in the detection screen.

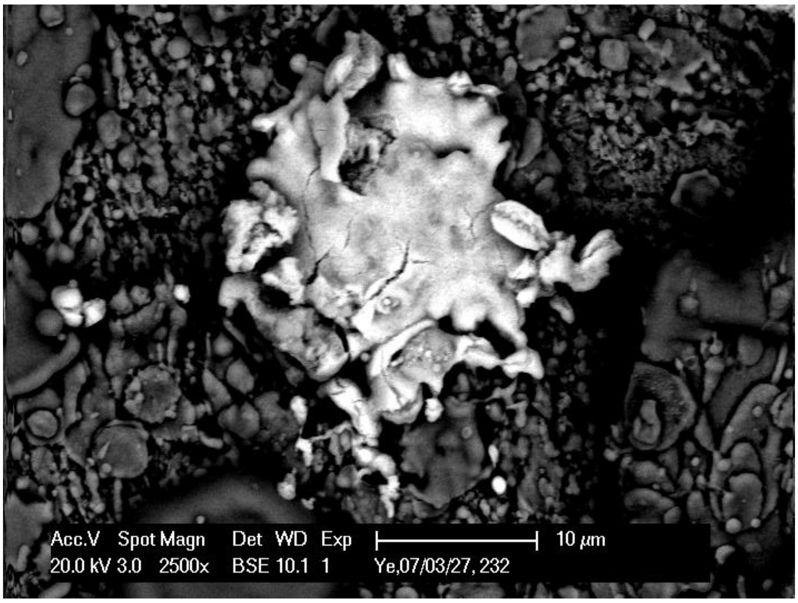
A consistent observation is that the detection of the "foreign" elements always occurs at the same spots. Varying the position of the electron beam a little bit increases or decreases the relevant heights of the peaks, but the peaks remain all together visible at the same spots. What we mean is the following : it is not Fe sitting somewhere and Zn sitting on a totally different area. If we find Fe then Zn is close as well as the other "foreign" elements and of course the elements that constituted the detection screen and the target.

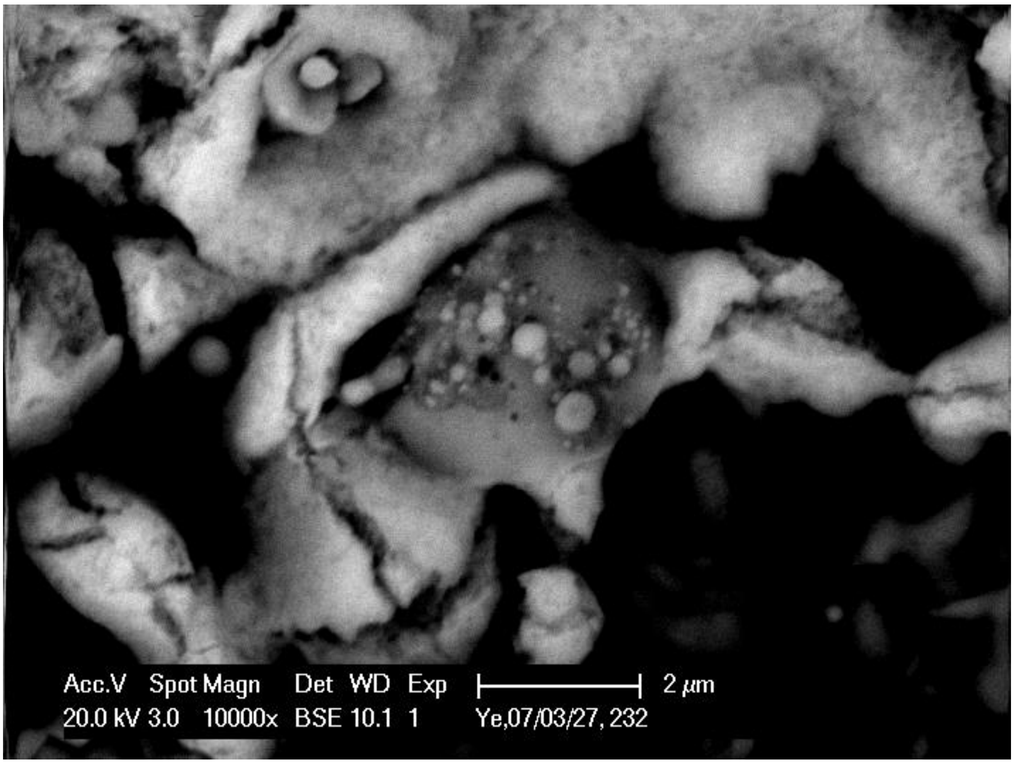


The next spectrum confirms the presence of the Si. Si is only found very locally and not evenly distributed on the sample.

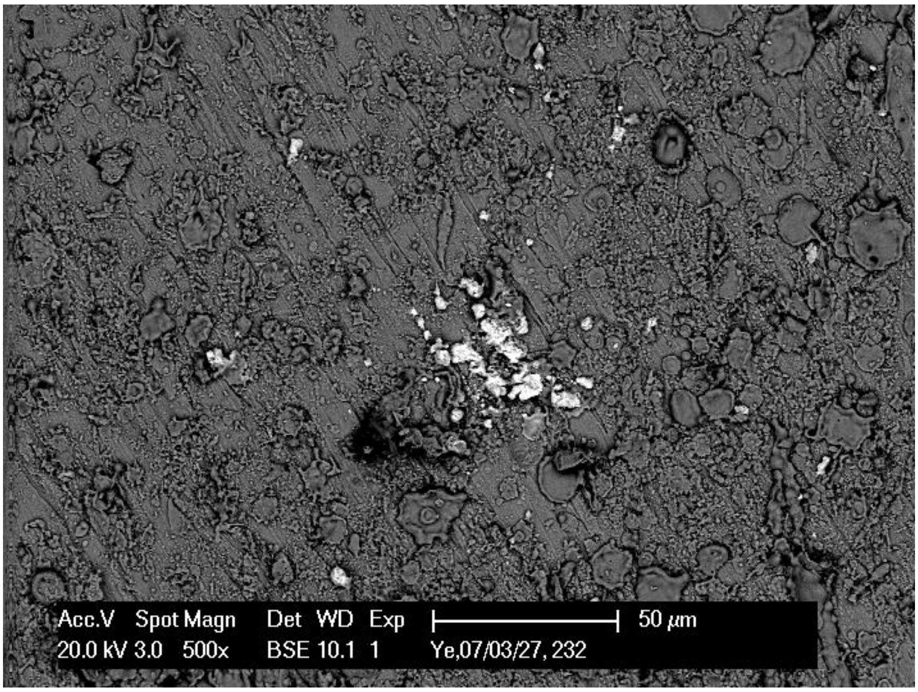
On sample 232 a redeposited Pb drop drew the attention. This spot clearly was born at the moment of the explosion because the morphology shows that is has dried in the sample. Further magnification revealed more interesting features.







On this redeposited Pb splash, morphologically proven to have emerged during the shot, the smaller particles can be found. Once in the micron and submicron world these additional "balls" on the surface seem to be different elements. However, it is not always obvious upfront to identify the exact nature of the different balls. The spectra vary with the slightest movement of the electron beam. Since the "balls" have the form they have and are surrounded by other larger particles it is not evident to make a clear quantitative and even qualitative analysis of what exactly they are. The measurements of the x-ray spectra take with them too much of the surrounding matrix. So, again, it is only with larger statistics and/or more sensitive and precise equipment that we can further study the exact nature of these “balls” on the Pb that itself was created and redistributed during the shot and the subsequent splash.

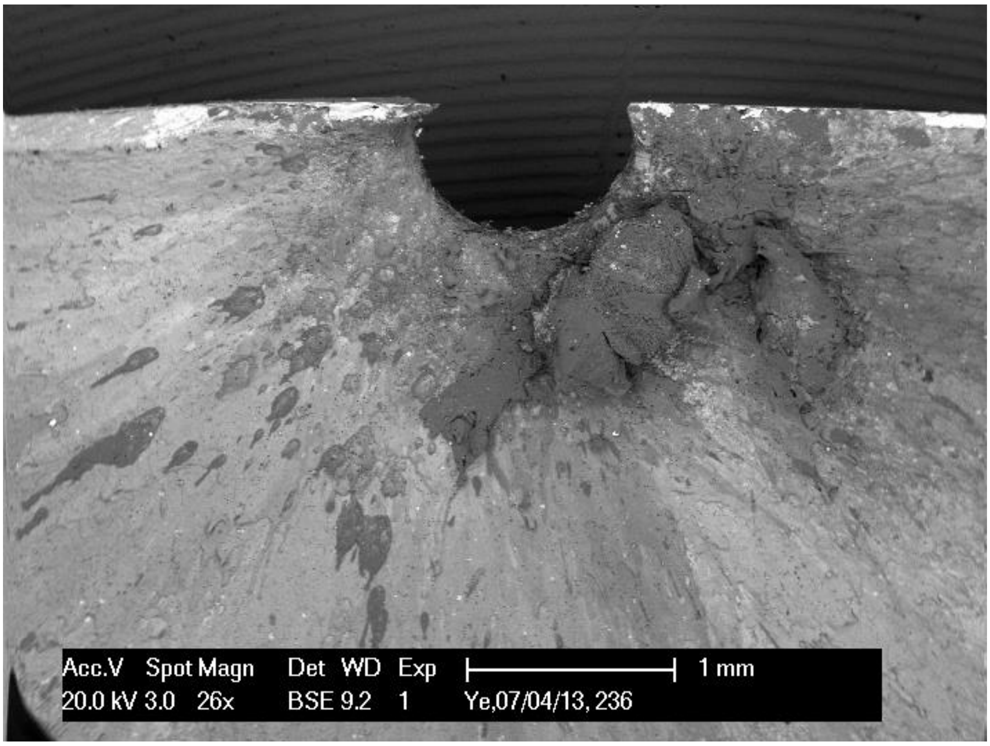


Sample 232 – which is a very interesting sample of Pb distribution on Cu detection screen – we can see everywhere evenly re-distributed particles that have “splashed” on the surface during the shot. Our experience is that ON these redistributed particles the most “foreign” elements can be observed. In the case of the sample and the picture above, the redistribution of the “splashed” material spreads exactly 50 micometer in a circular form around the point of impact of the Pb particle on the redistributed Pb from the target lying on the top of the accumulation screen.

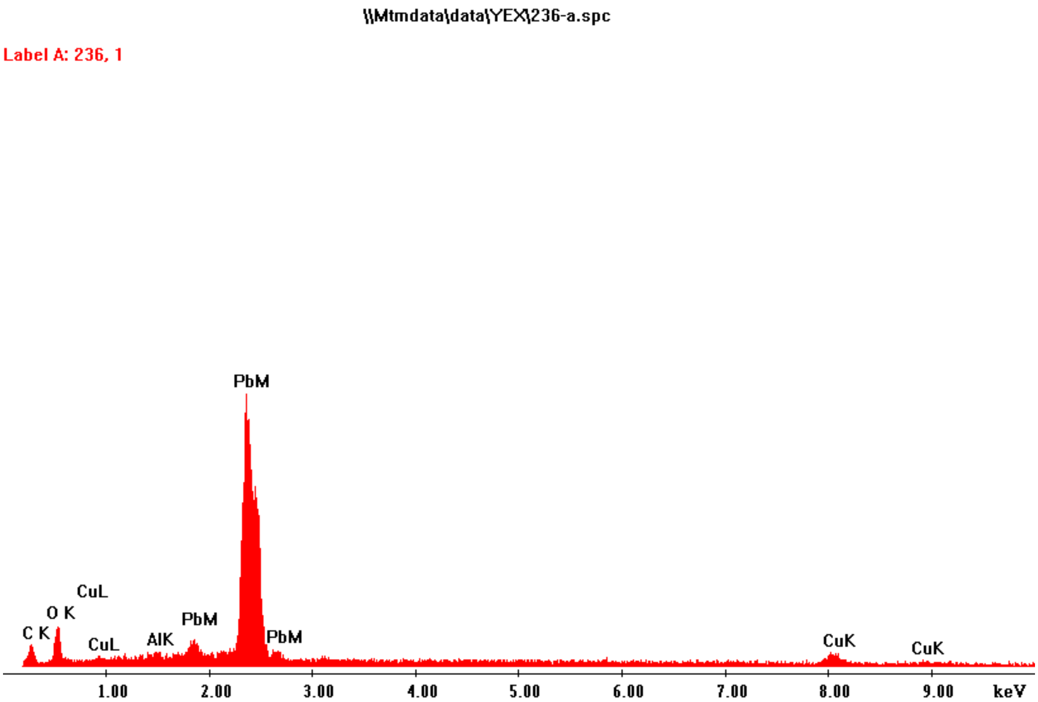
The splashes on top of the redistributed Pb on the Cu screen represent the parts that were deposited during the shot. Those are considered to be the result of the “plasma” in the top of the target. It is on those splashes that the “foreign” elements accumulate. In the assumption that the splashes are a consequence of the redistributed plasma it is an indication that the foreign elements reside and are created in the plasma tip of the target material during the shot.

It is considered impossible that they are redistributed there as impurities afterwards, because they sit on the redistributed Pb.

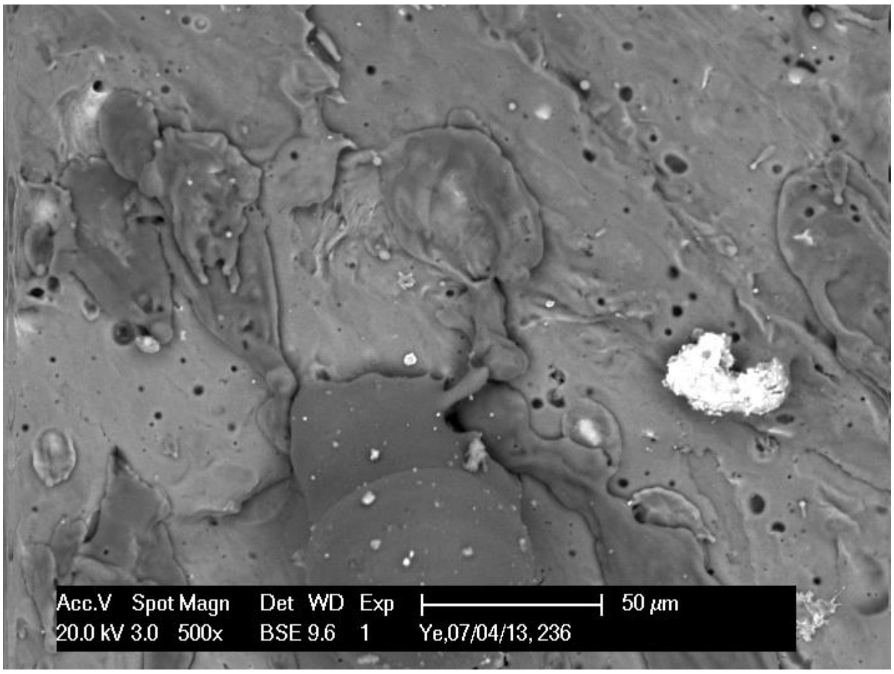
It is considered impossible that they are a consequence of segregation from the target or even from the Cu detection screen as they sit on top of the redistributed Pb. Segregation could not occur in that way and could not put these foreign elements on top of the redistributed Pb.

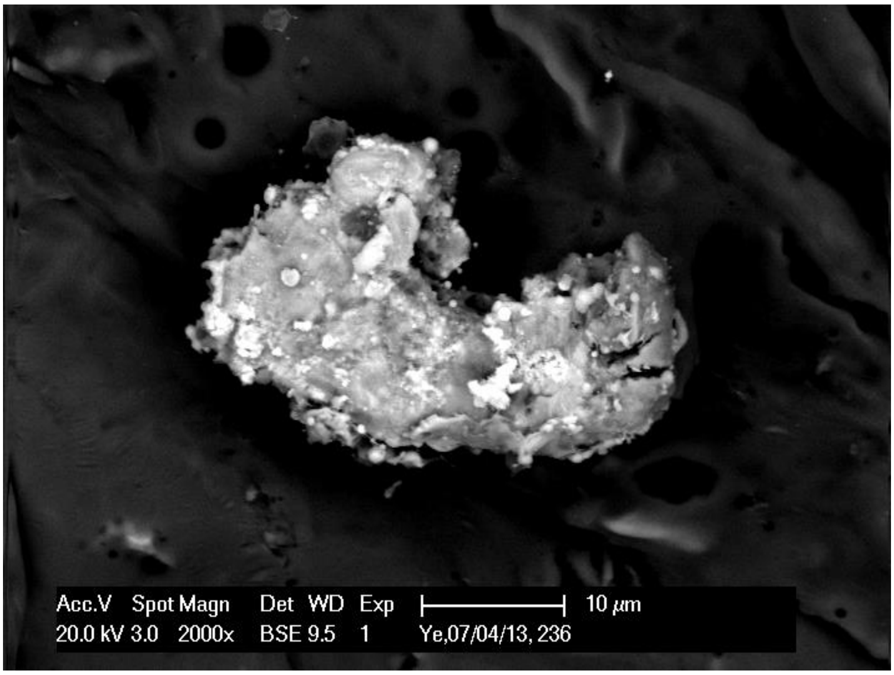


Sample 236 is another example of the same. Distribution of heavier elements on the detection screen. Each little white spot deserves to be investigated. Typically it is on top of these spots that submicron particles rest of different composition.

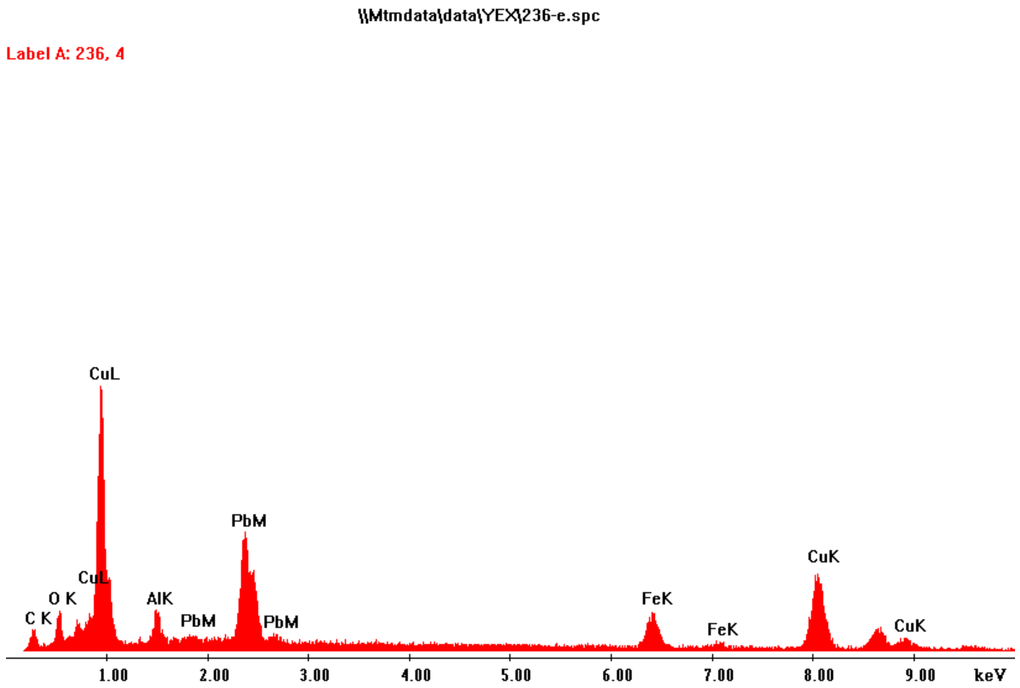


Improved statistics would show more detail and still better proof of the presence of the transformed elements. For a first screening these results are convincing enough.

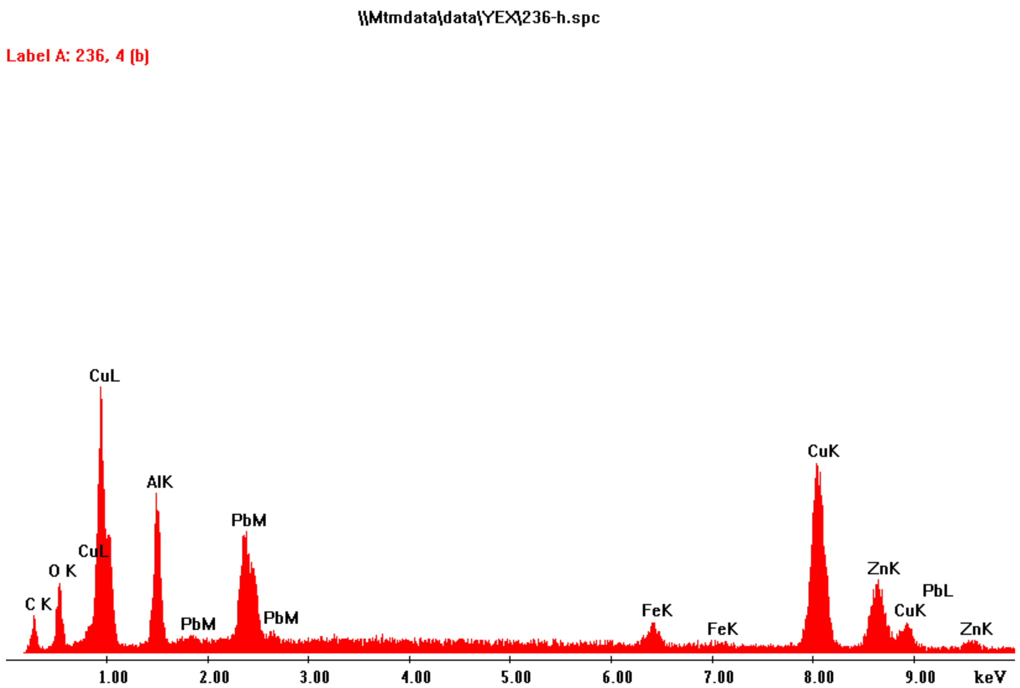




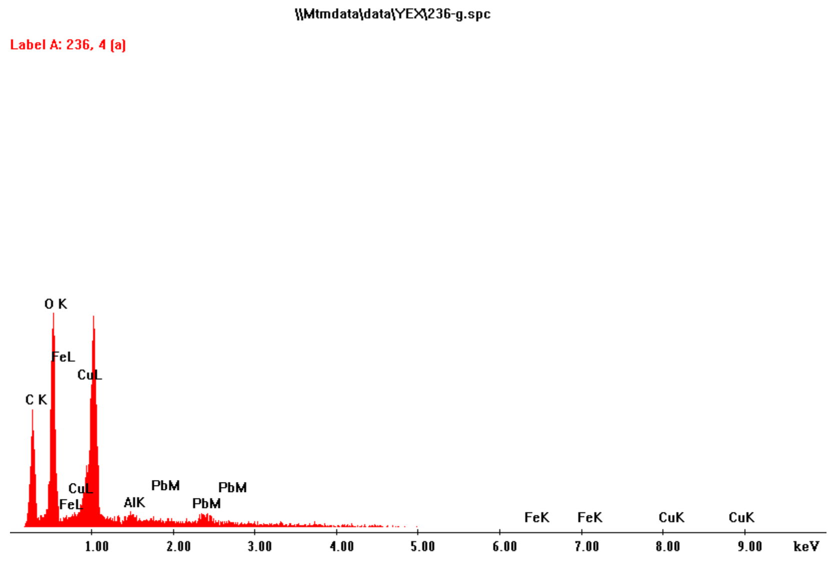
The particle on sample 236 is a good case of redeposited target material from the plasma. It is an instance of a larger cluster where most of the particles are still clustered together and have not further exploded on the target surface. You can see on the first picture that the larger particle is surrounded by more smaller similar particles, probably coming from the same origin. The morphology shows clearly that larger particle is deposited on top and constitutes a series of smaller particles of different composition.



First high level analysis of this particle reveils immediately the presence of "obvious" foreign elements in larger quantities.



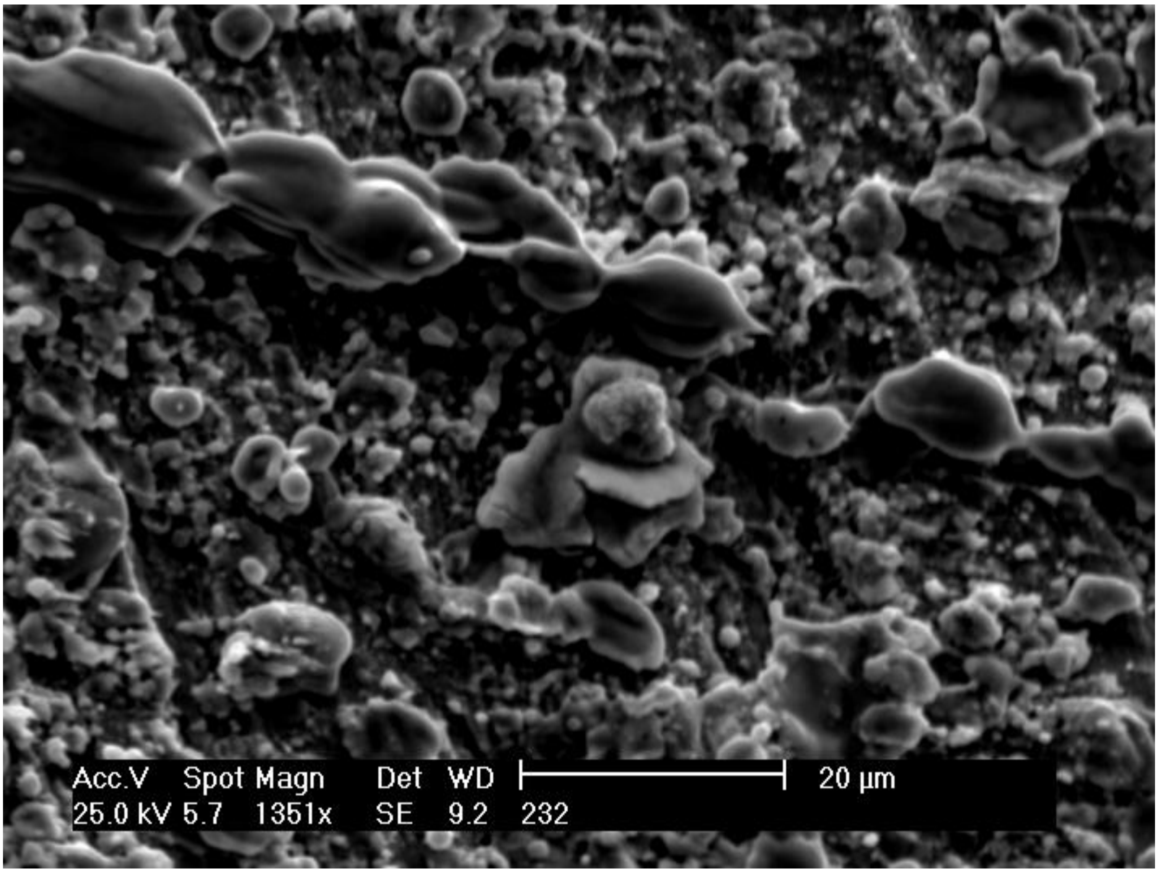
Zn, Cu, Fe, Pb, Al, Cu, O,… can easily be identified on the larger particle.



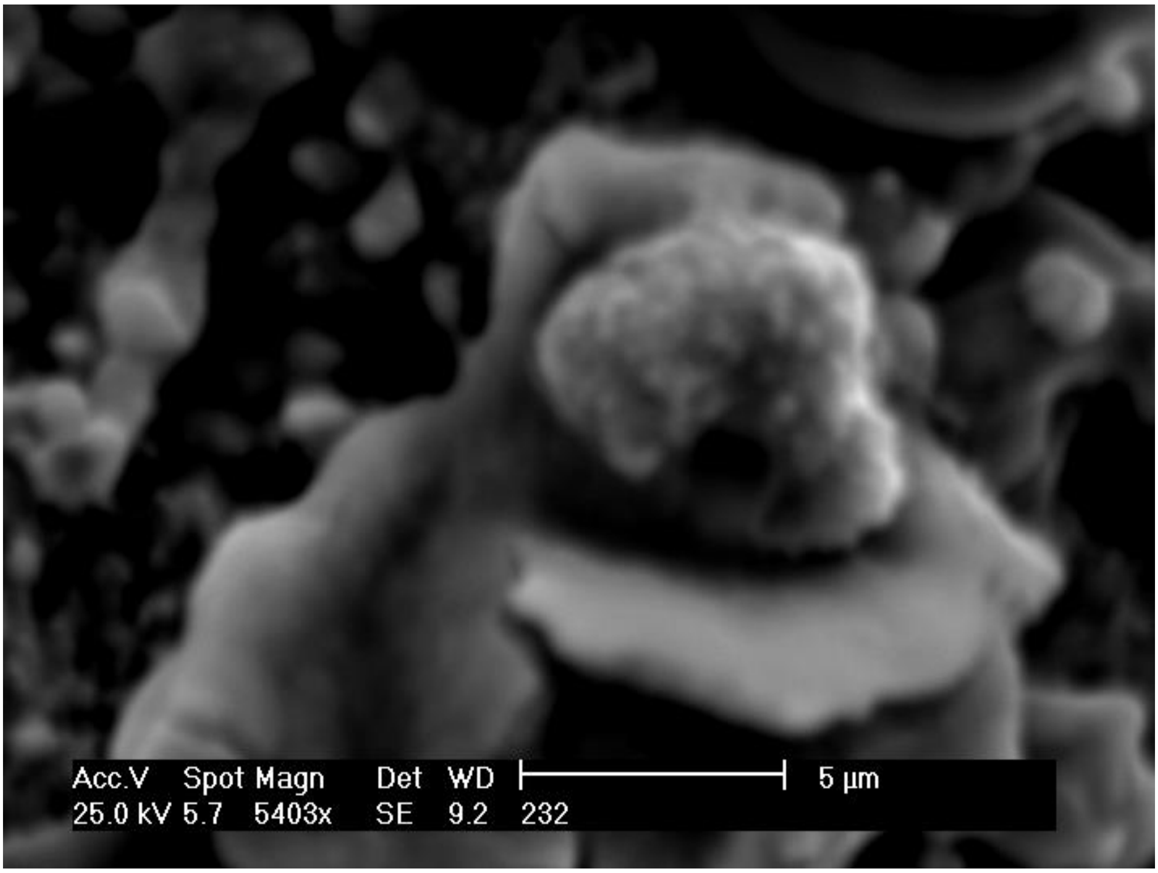
Experiments with lower energy were carried out in order to find out if the foreign elements are rather on the surface or in the core of the particle, but these experiments were not conclusive.

Conclusion only is that they can easily be detected and identified and that they always sit on the redistributed particles as “sub” particles on the redistributed particles.

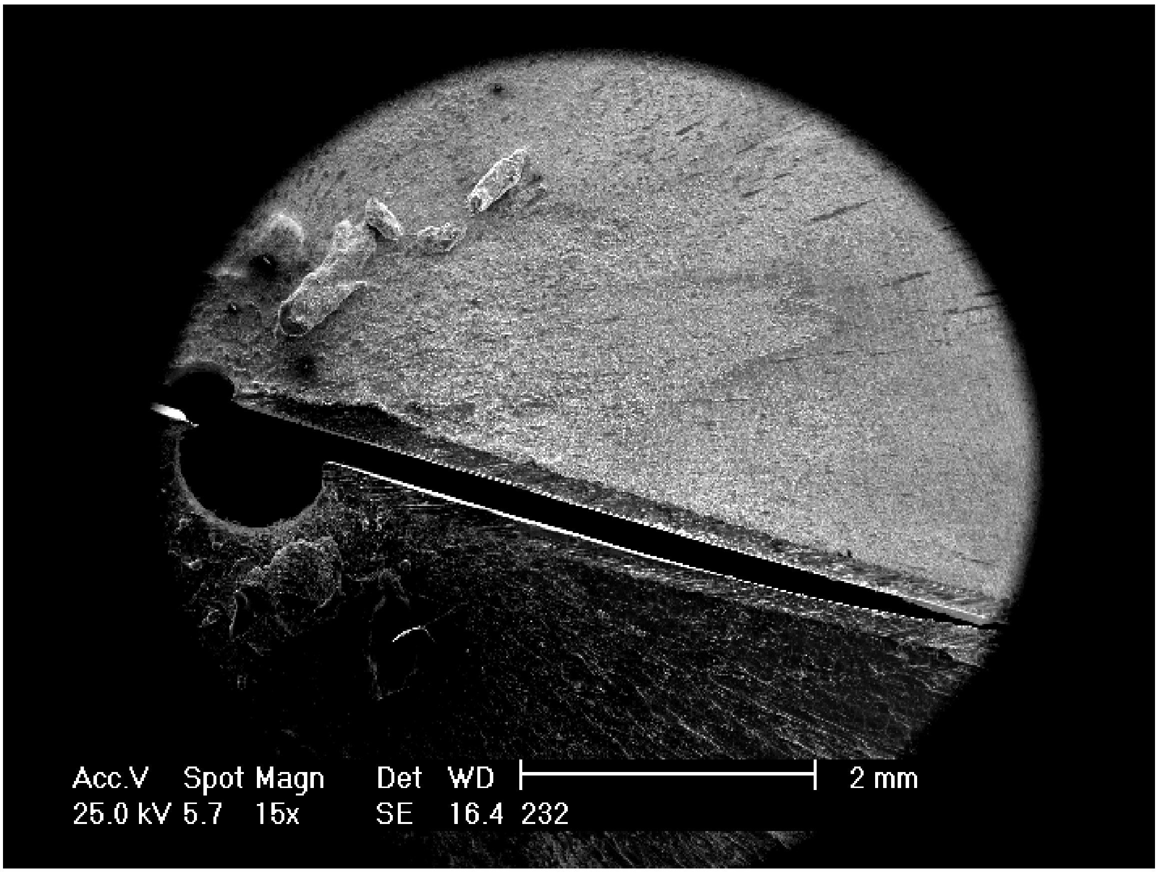
We have sufficiently proven the presence of foreign elements and we have suggested a technique to identify them easily on samples.



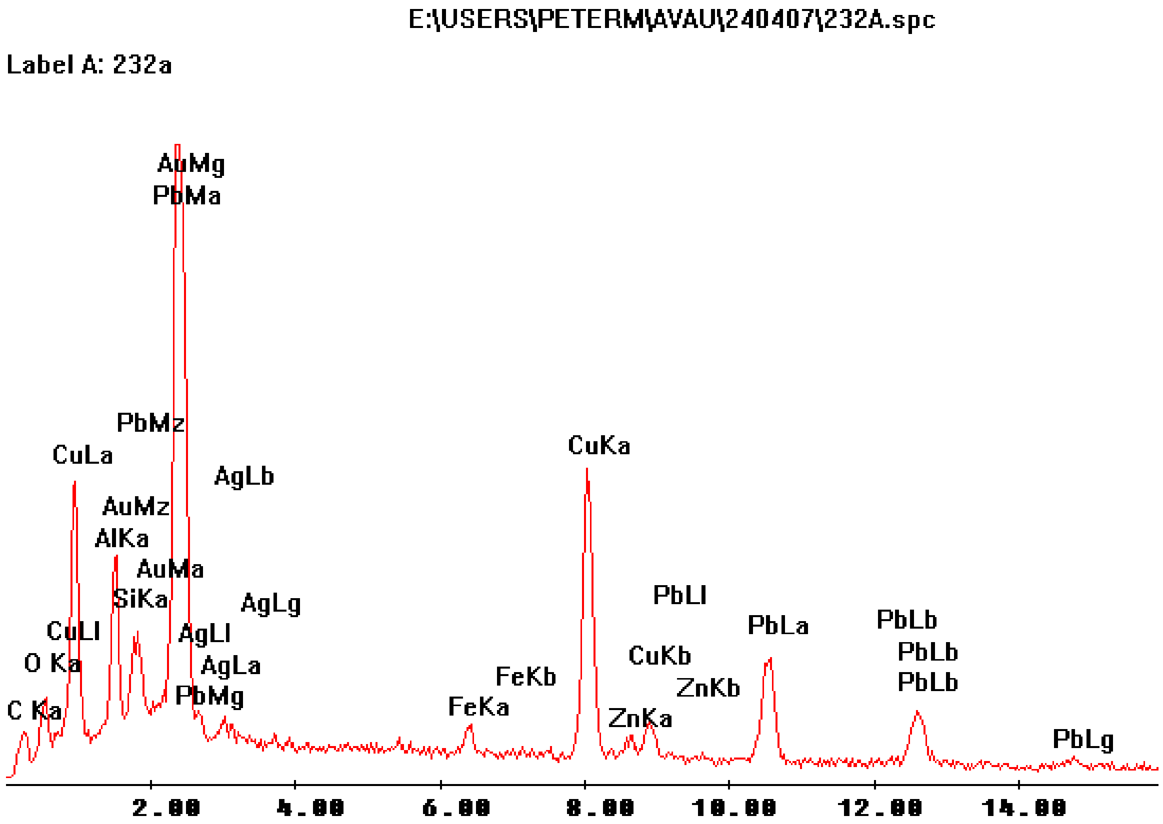
A more detailed secondary electron picture of the particle of interest lying in the "flower".



SE picture of the “flower of Pb, with the new particle in it”.



Picture allowing to identify the position of the particle to find back for future measurements. Interesting is sto see how the damage is spread over the surface of the Cu accumulating screen.



Spectra taken on the particle. Xrays come from 1 to 2 microns deep, and since the particle is that size this is a form of "integral" analysis of the composition of the particle.
The fact that the peaks are so high and so visible is a proof that the elements represented on the spectrum are present in relevant concentrations.

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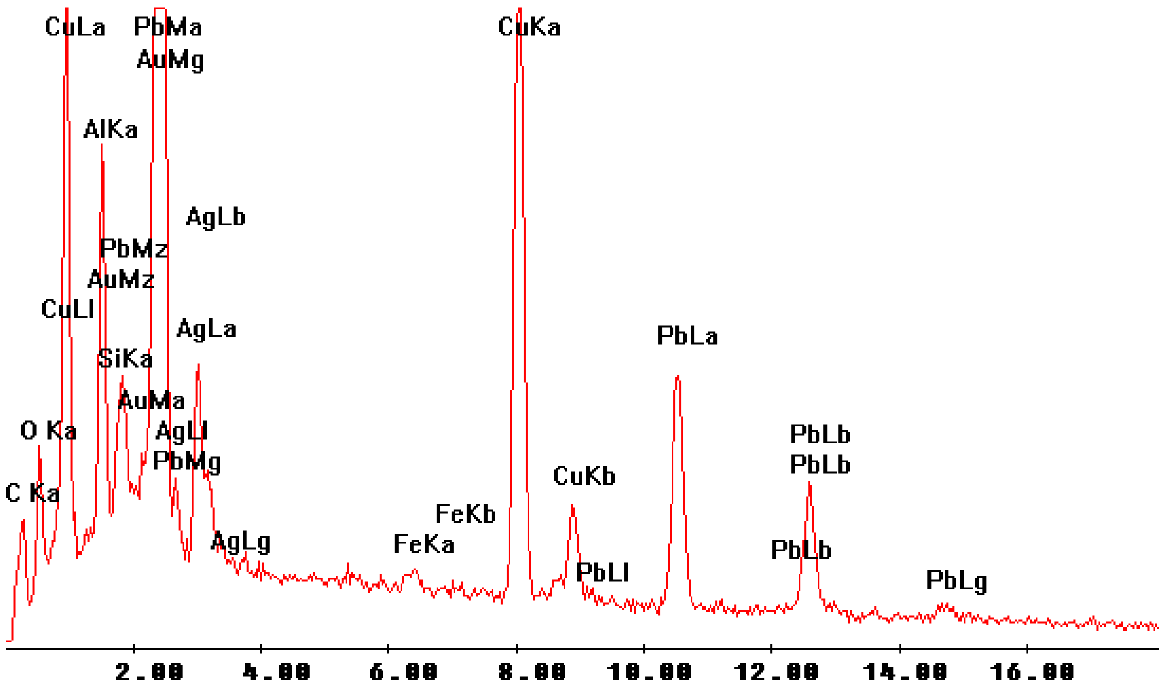
Label A: 232b



Depending on the exact positioning of the electron beam on the sample other results are obtained. More specifically the peaks change in high and concentrations change. This is an effect of the measurement technique.

During these experiments the presence of Ag was clearly measured. According to the operator the presence of Au was also strikingly confirmed. For Au there is however still a little doubt because of overlap with the peaks of Pb. Measurements prove that there is gold, but scientifically it would be nice to find the Au also with another technique to have full confirmation. The other peaks mentioned such as Zn, Fe, Ag, Si, etc. are easily measured with certainty.

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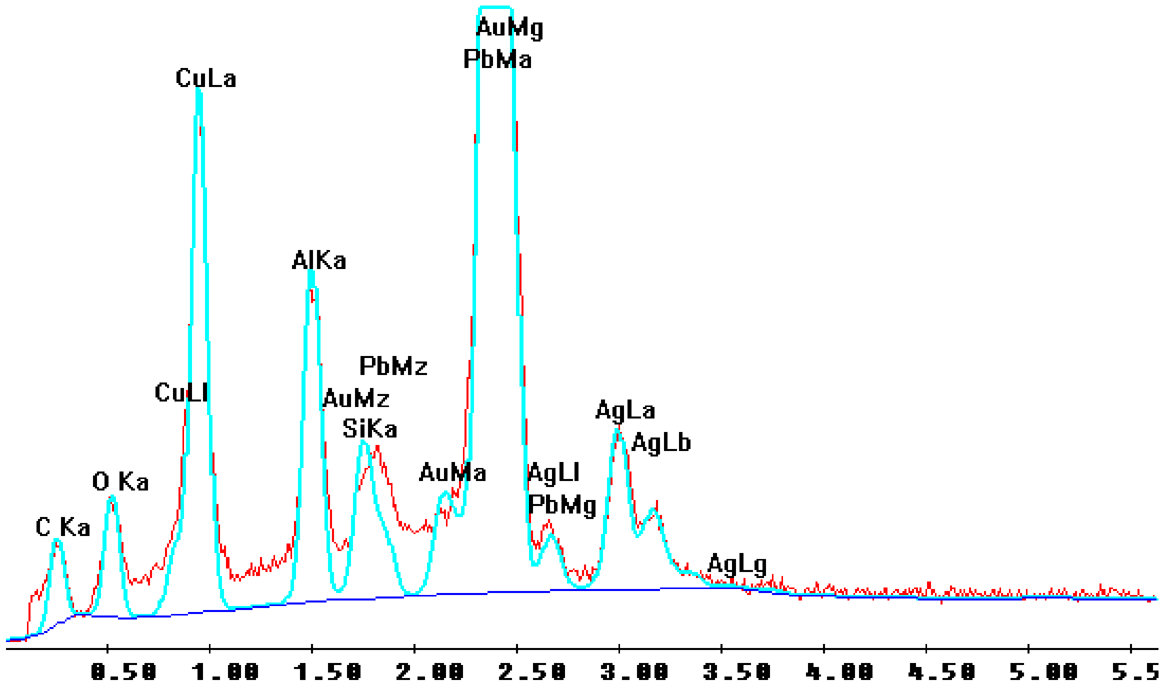
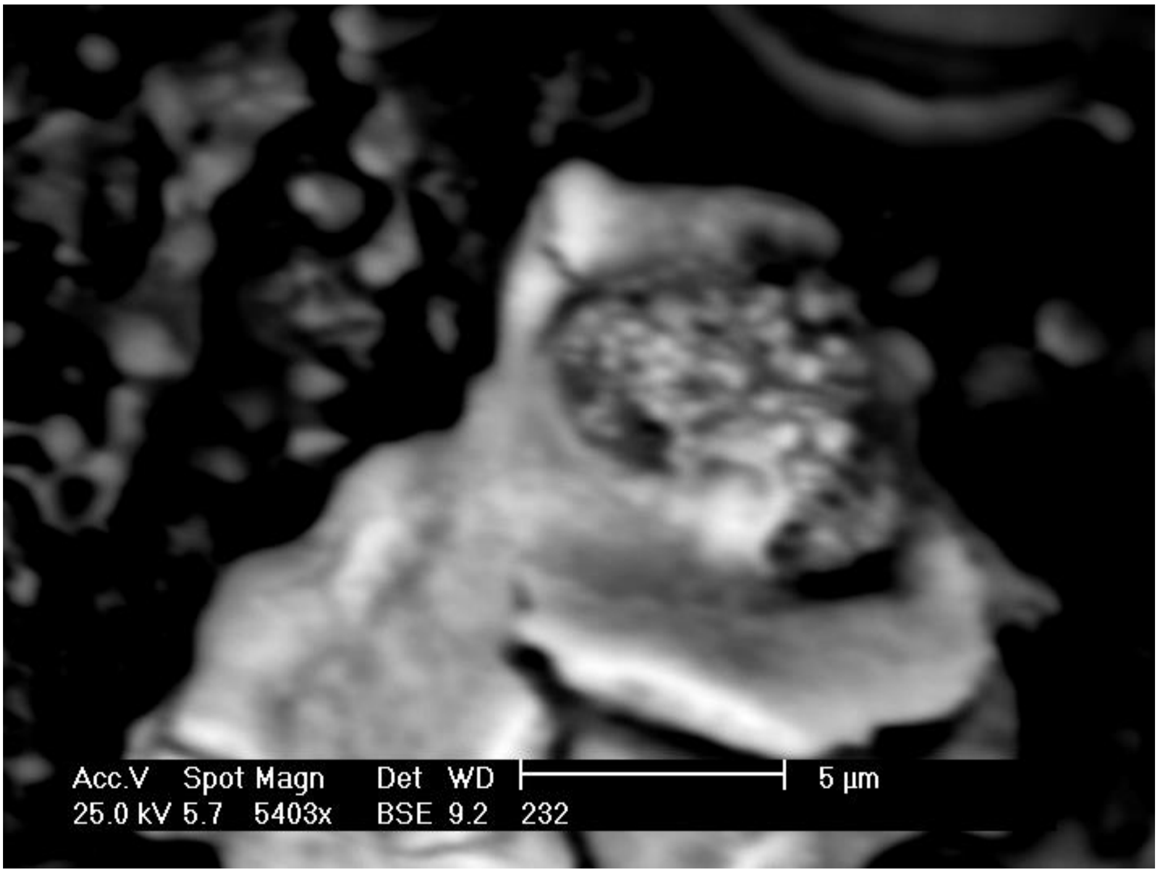
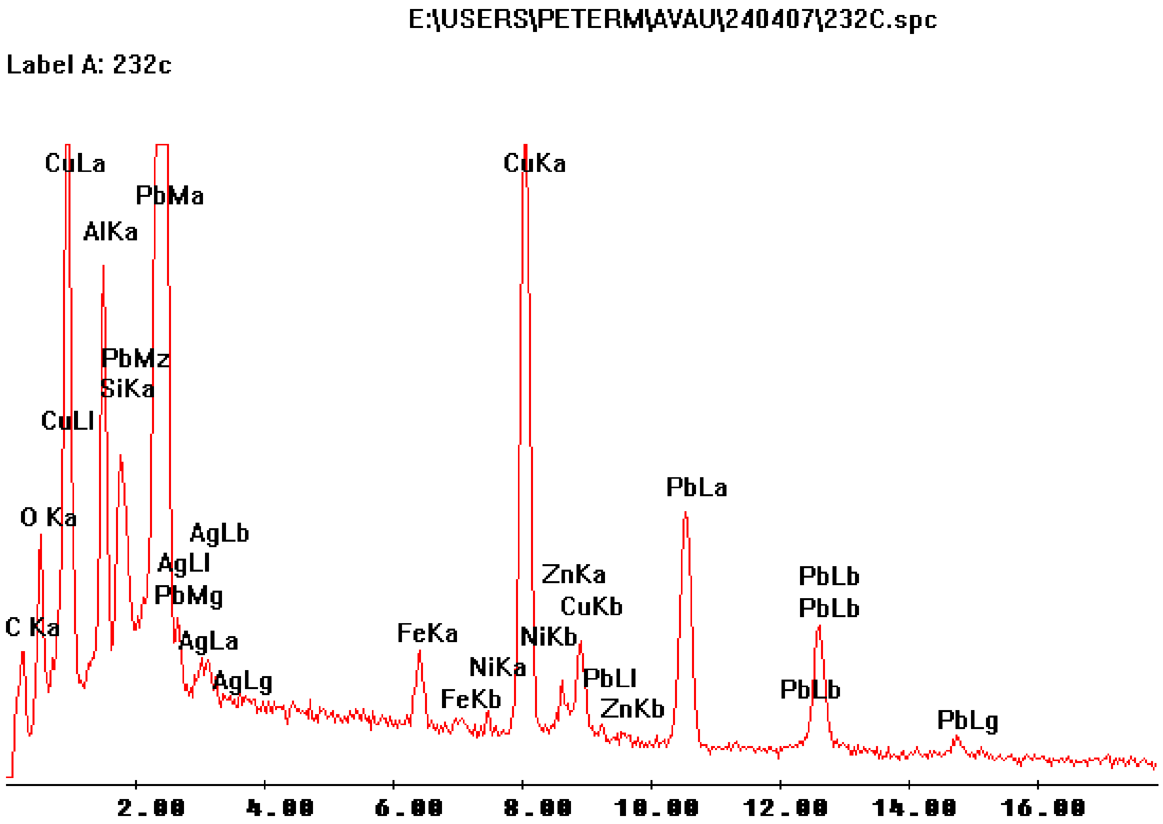
Label A: 232b



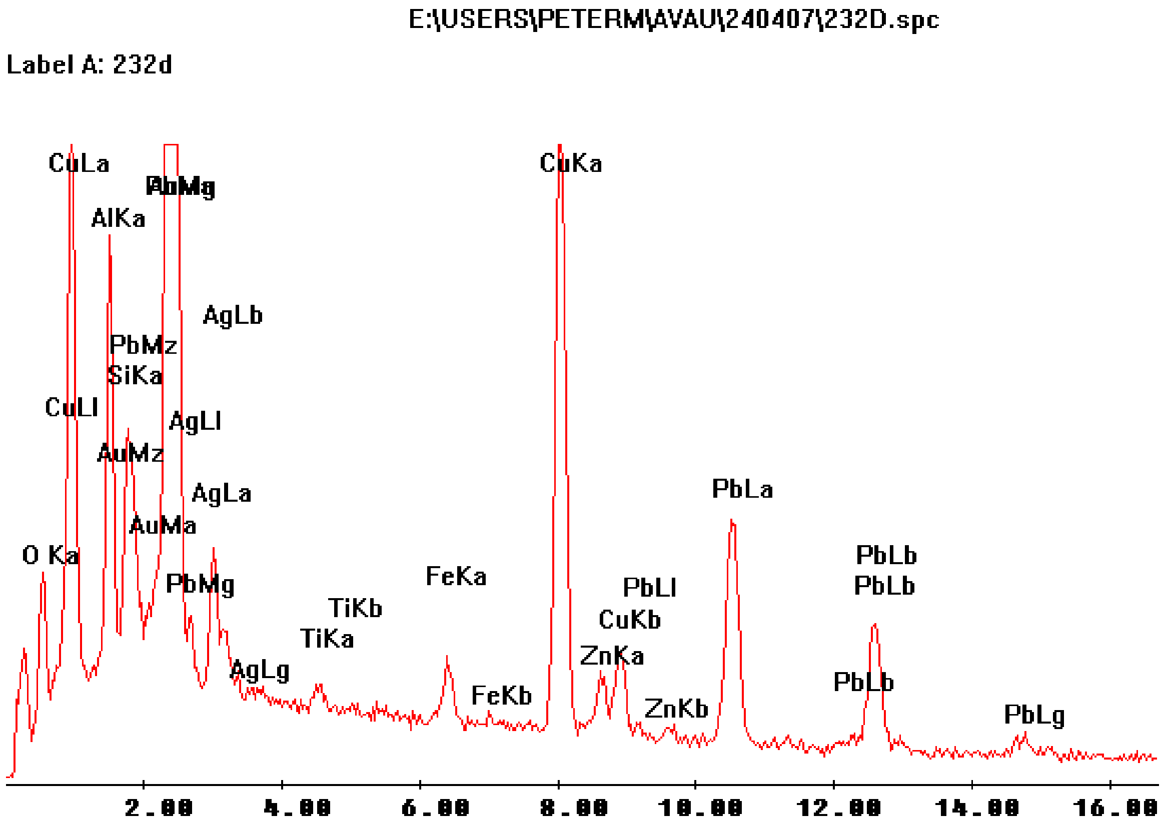
Absolutely clear presence of Al, Au, Pb, Ag et… These are “computer” adjusted peaks done by automatic analysis using the software delivered with the machine. On this spectrum the presence of Ag is tremendously striking. With the AES it is proven that the Ag is sitting IN the sample (not on the surface).



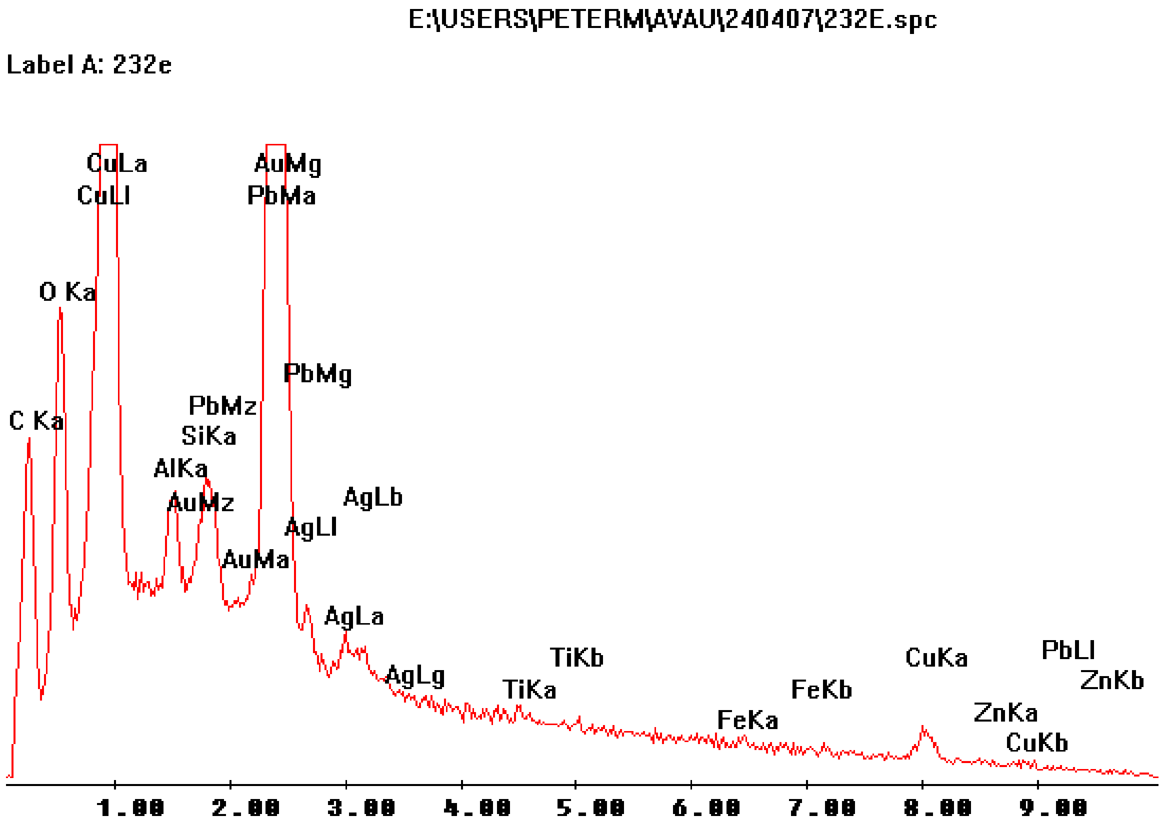
Backscattered image of the Flower and the particle. Whiter spots are heavier elements. AES however has proven that the elements like Ag cannot be found really on the top surface layers but rather inside (up to 1 micron deep).



Another example of spectrum taken on the particle. Presence of Ag (in a lower quantity) Fe, Ni, Zn, Al, …
Pb seems to be an element that can extremely easily be detected although it is a Cu/Cu experiment. The other elements are a little bit more difficult to find, but if one finds the right spots then it becomes also an easy thing to prove the transformation.

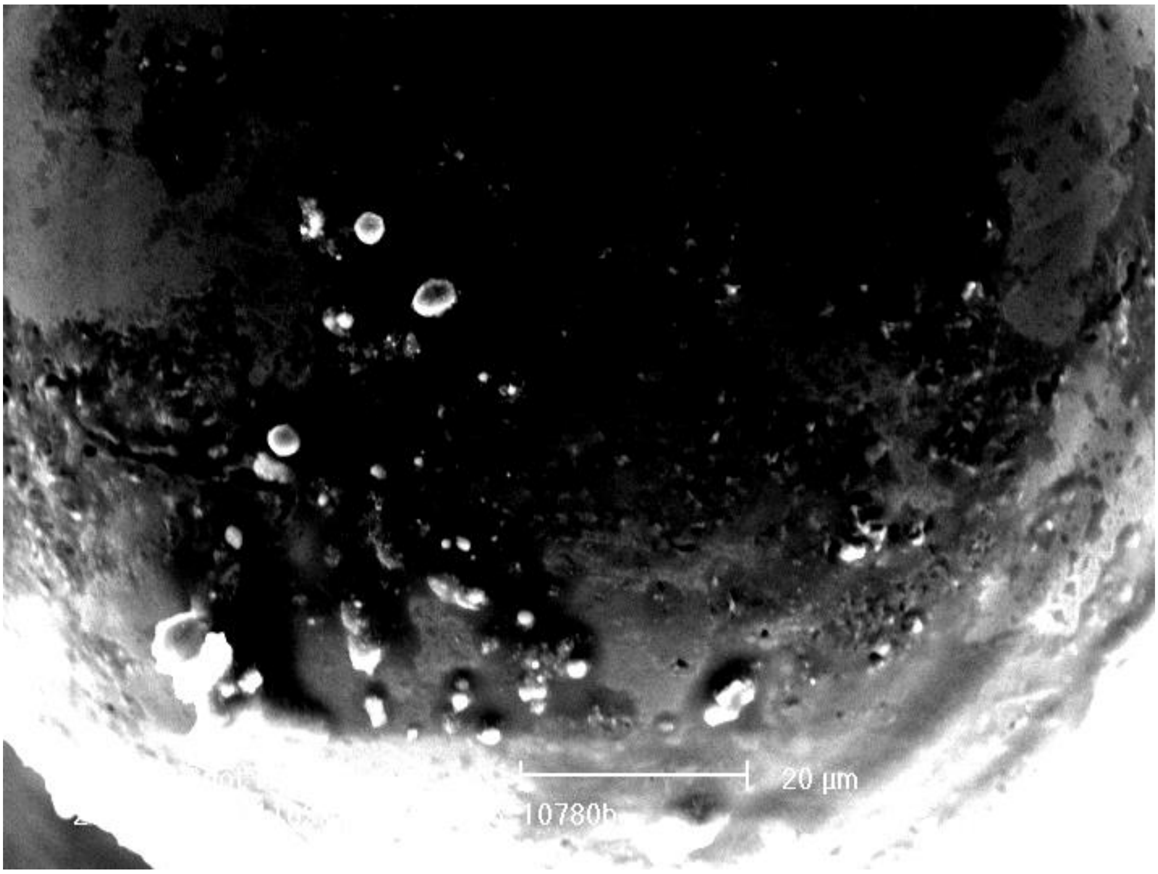


Evidence of Ti. (besides the other elements detected).



Evidence of different elements on the same sample in the same spots.

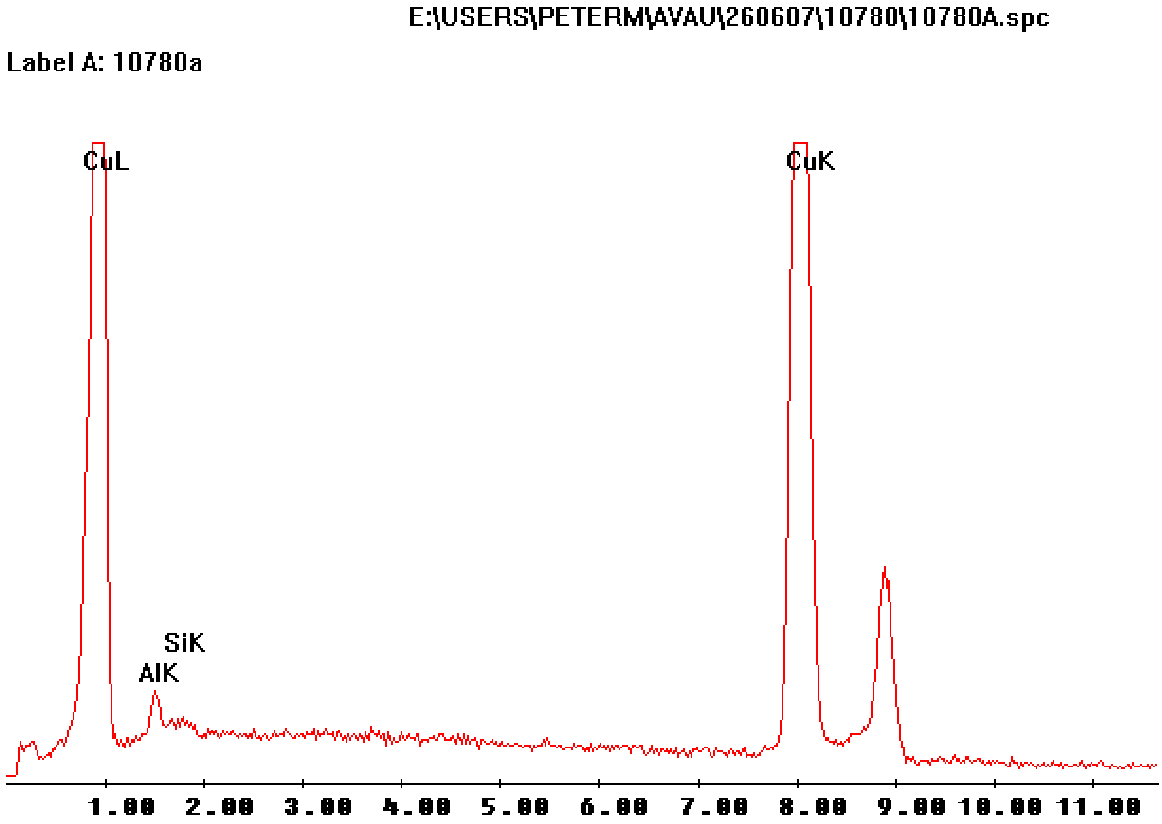
Sample 10780 :



Different areas with different compositions show color differences on the detection screen. Typically the detection screen is covered at the surface with a number of particles. The perfectly shaped round particles are usually totally uninteresting, just containing the initial Cu that was melted and subsequently again solidified.

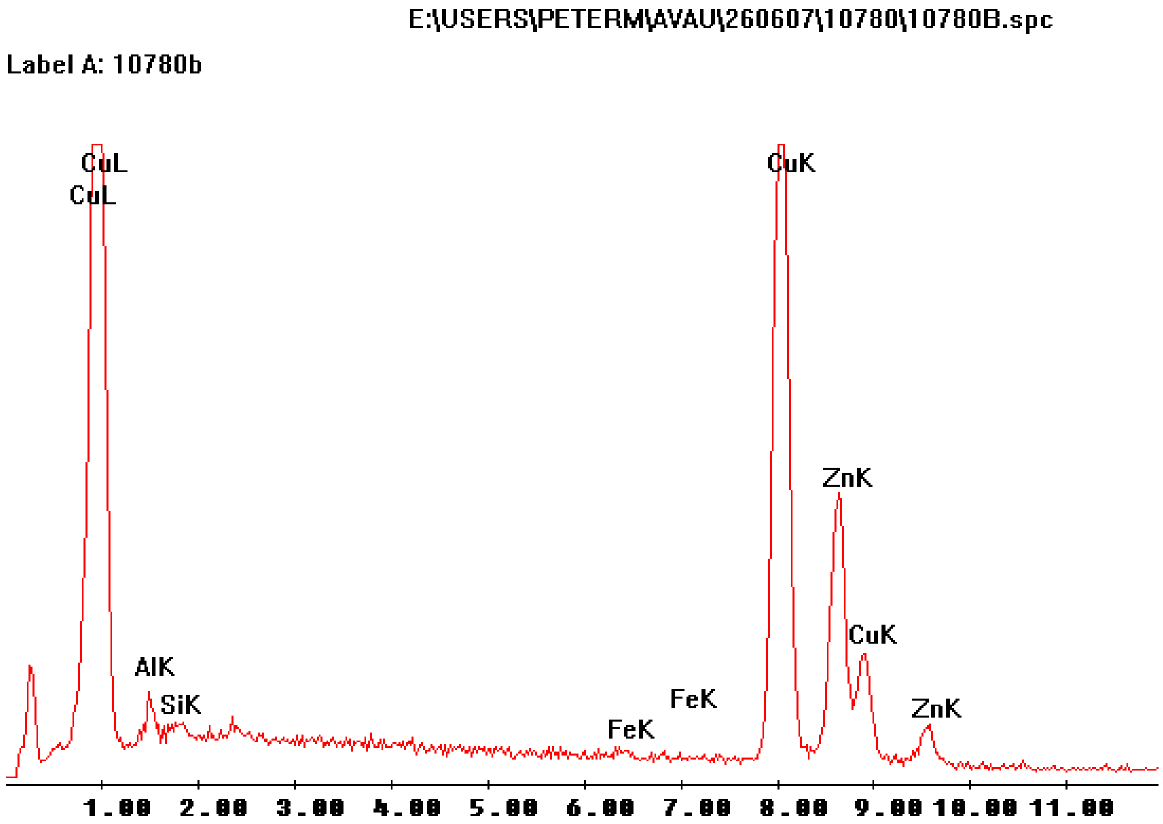
The “meteorite like” particles can be detected regularly. They show up in backscattered Electron pictures and always contain a variety of elements.   Of those typically Pb can easily be detected and measured, other elements are Fe, Si, Al, Ni, Cr…

Positon a on the sample



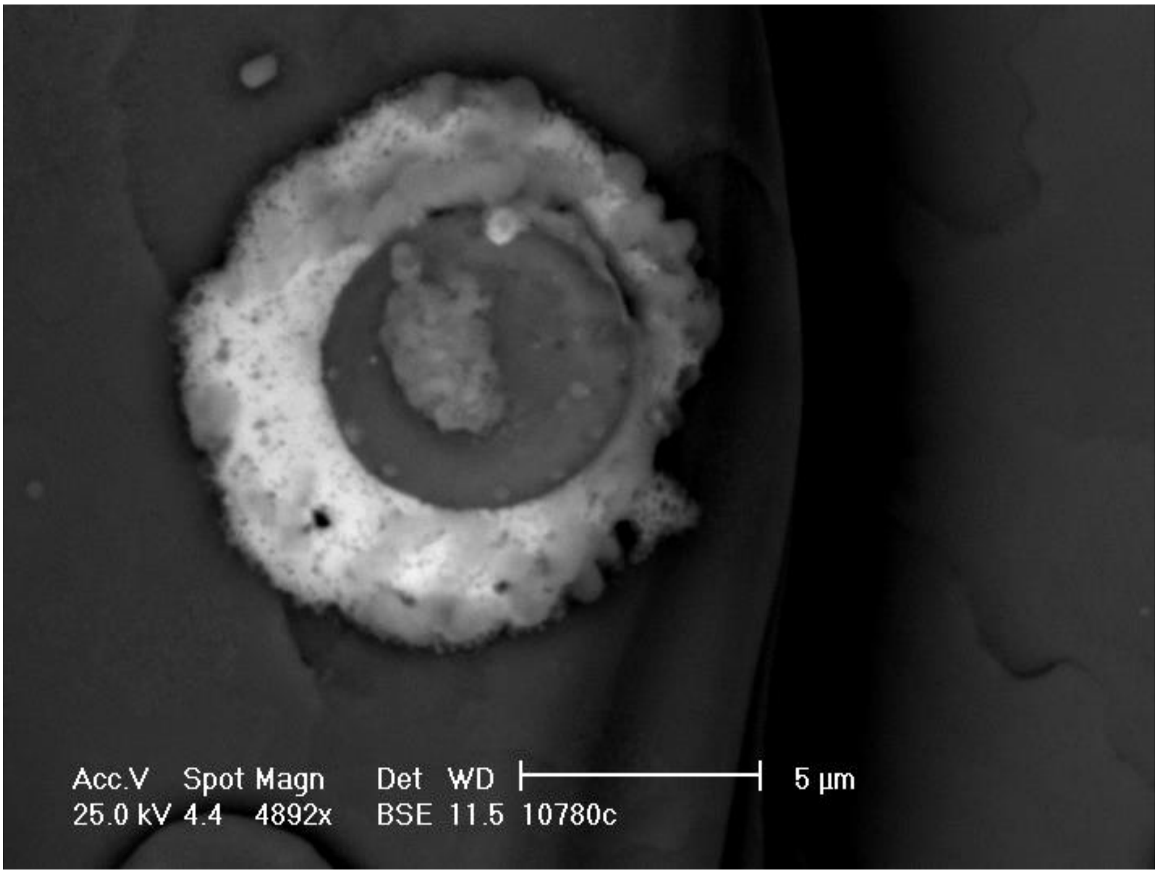
On all samples and position Al (and maybe also Si) can easily be detected. For our experiments it “could” be a product of transformed matter, but since we see it regularly and almost everywhere it becomes uninteresting for our purposes.

Position b on the sample :



Focussing on some particles sitting on the surface Fe and Zn can easily be found. They are more an indication of transformed material than the detection of Al or Si. As confirmed in all experiments so far, the particles contain systematically foreign elements that by far exceed the level of impurities anywhere else in the sample. The spectrum above on Sample 10780 proves the presence of Al, Si, Fe, Zn….

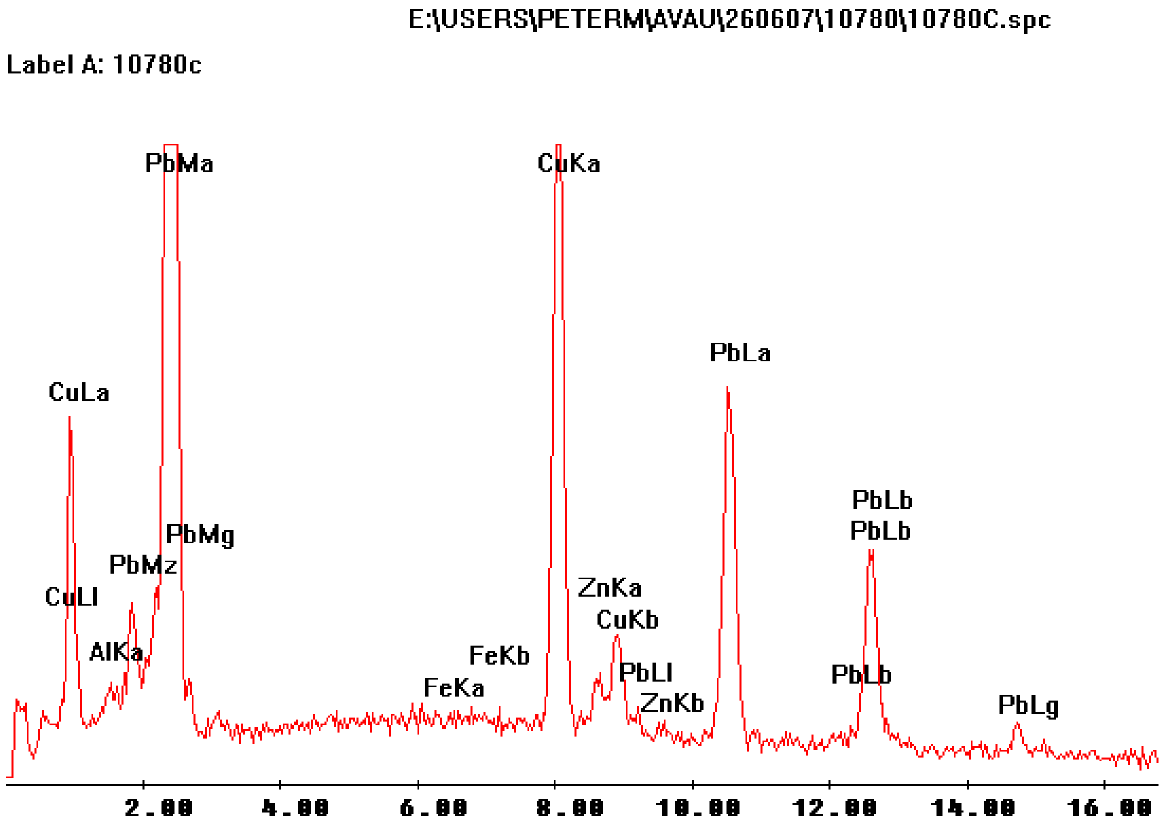
Position c on the sample :



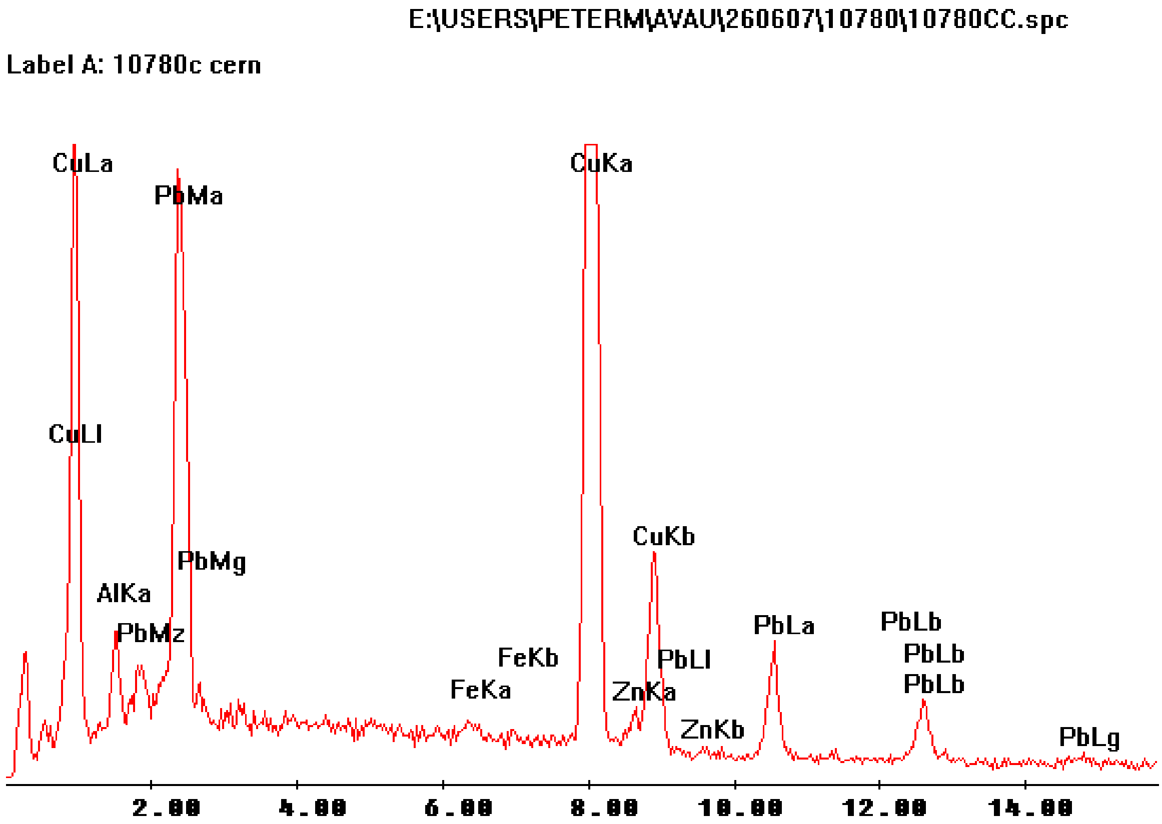
The particle is a round kernel sitting in a “flower” of Pb rich metal, deposited on the Cu detection screen. In BSE image the whiter the area, the heavier the elemental composition is.

The peculiar thing on this sample, not yet observed, are the shady “clouds” around the particle. The clouds are of a different composition but it cannot be distinguished because the layers of the clouds are too thin. On the central spherical ball there is a “meteorite” structure sitting on top.

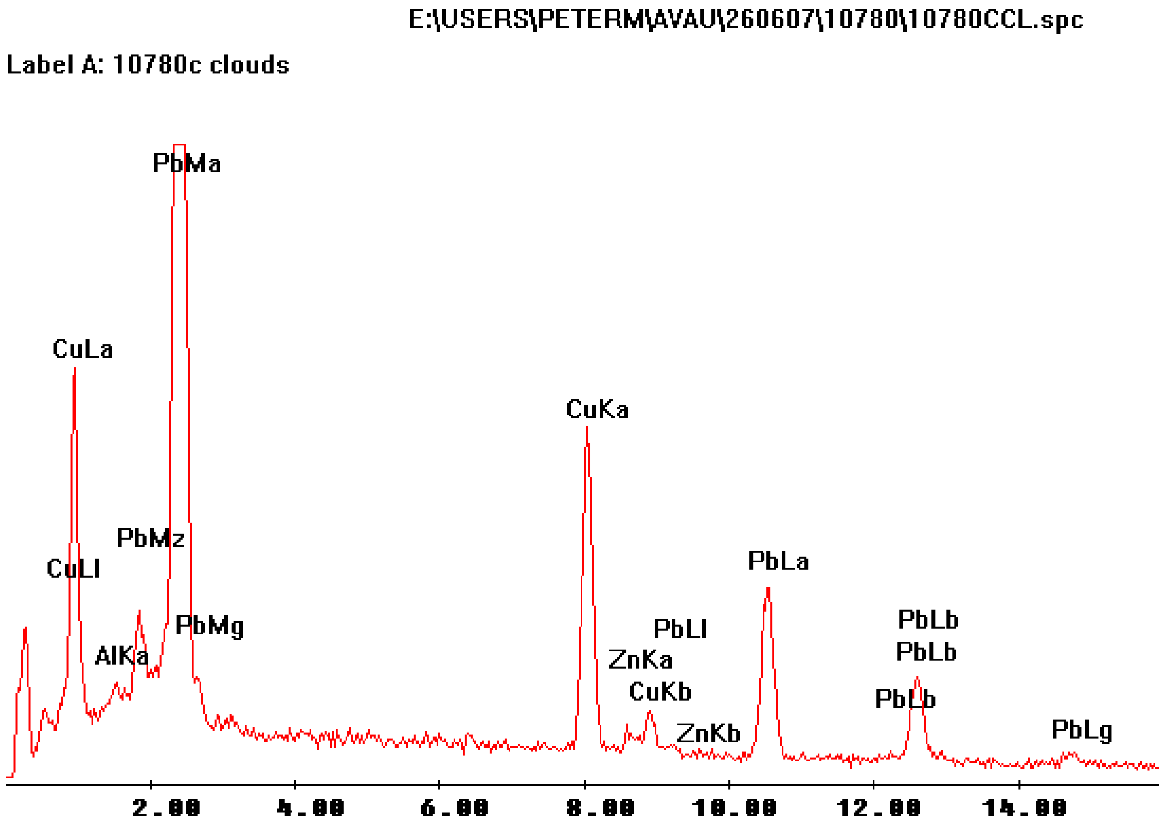
Also interesting to observe are the black spots on the “flower” because they are positions of elements with very Low mass (we think typically B or C… or other as detected in the Iontof experiments.



Pb, Al, Zn, some Cu left and some traces of Fe are to be found in and on the particle.



The ball shaped kernel is Cu rich with Pb, Fe, Zn…. Etc. We should however take care with the detection limits because the Xrays come from areas about 2 micron big.



Besides the observation that the "clouds" are very Pb rich we cannot really conclude a lot more with this measurement about its compostion.

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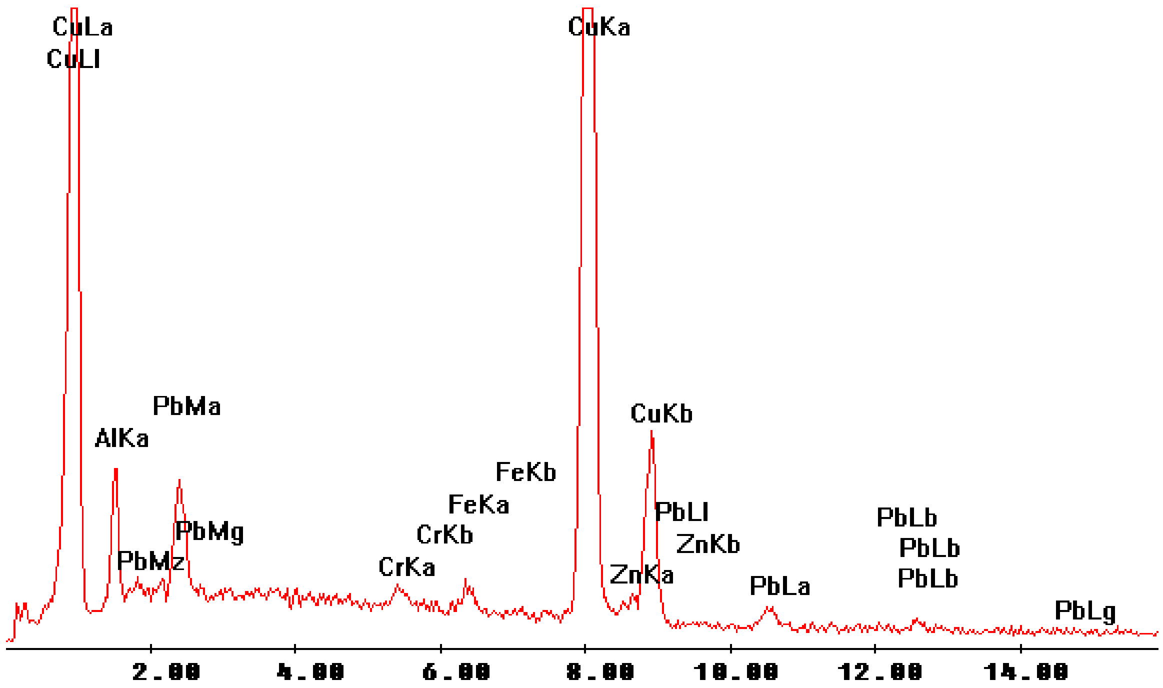
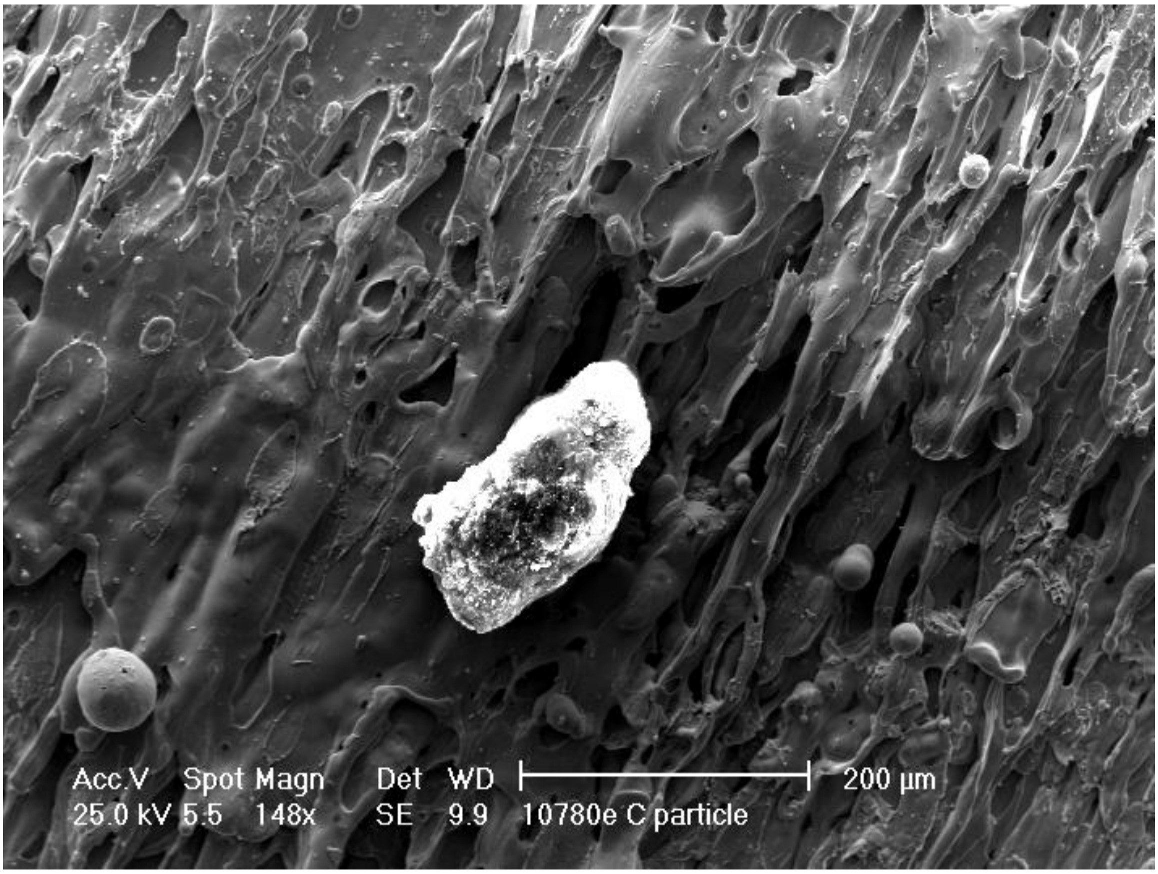
Label A: 10780c next cern



This is a repeat measurement on the kernel on the Cu rich spherical ball. The Cu is dominant, the Pb is still observable but less dominant and Cr, Fe, are easy to detect.

Spot e on the sample :



Sample 10780 showed a rather unique C rich particle (please remark its size of 200 microns), with exceptional amounts of C but also Cu, Pb, Al and Zn. It is a typical "meteorite" like structure, but now with clear proof of presence of the C (not only as a surface phenomenon). The direction of the reflown Cu can easily be observed on the picture. The "meteorite" is lying on top of this surface. The particle has dropped on the surface as a very hot substance when it dropped because of the effect is has on the previously reflown Cu.

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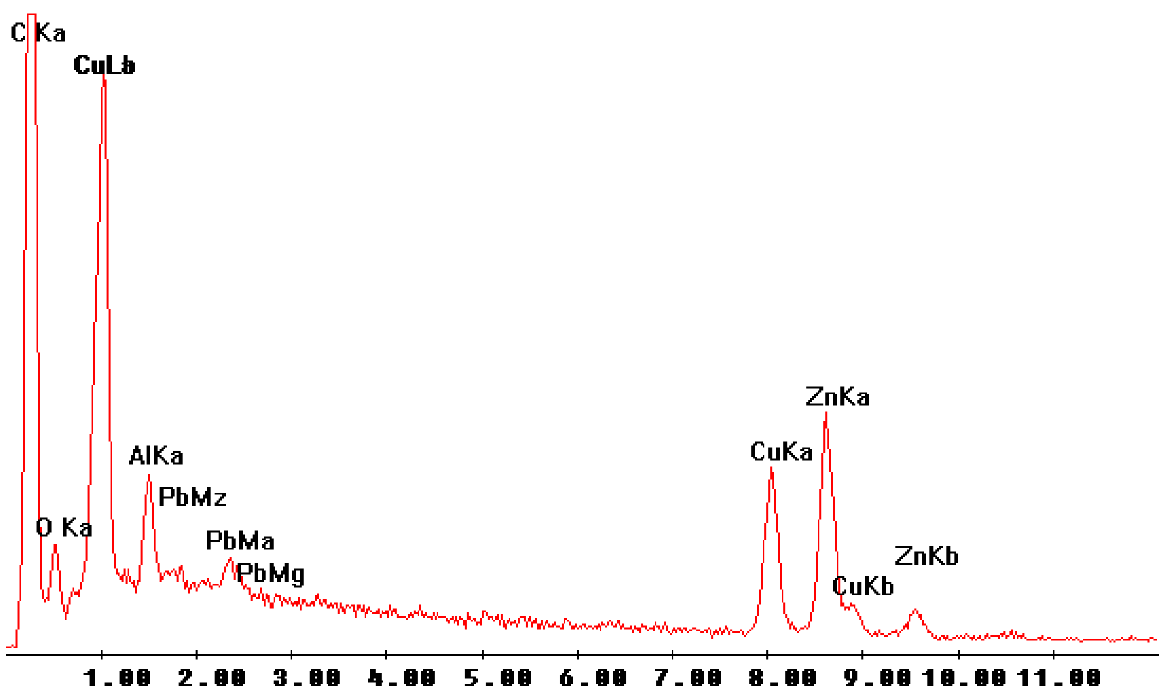
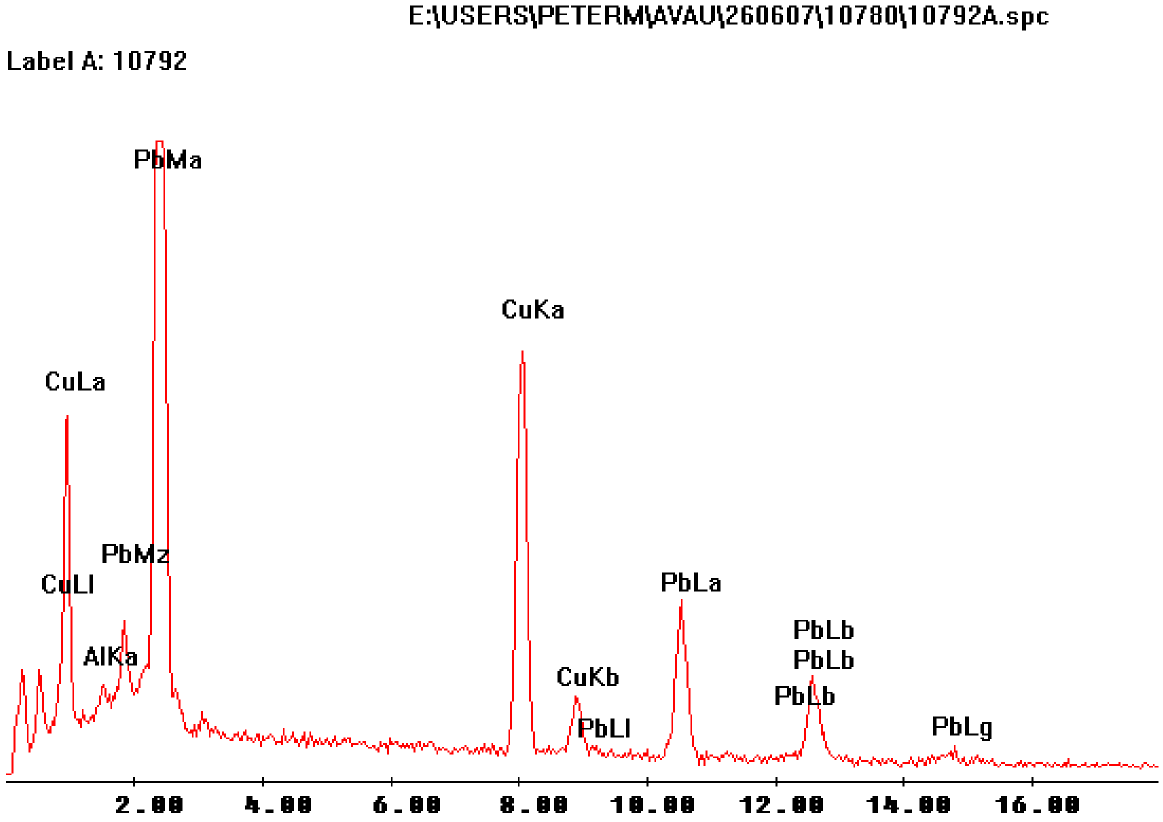
Label A: 10780e C particle



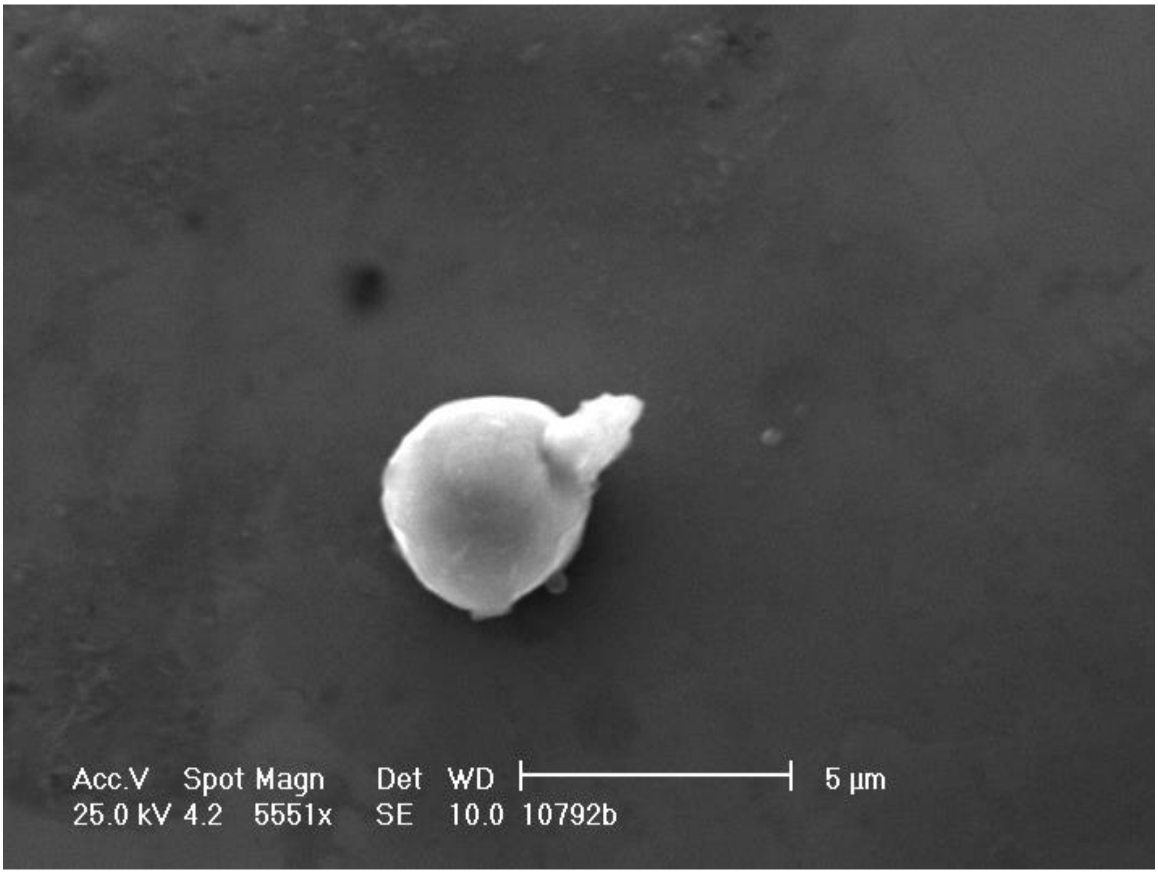
The particle is so big that we can confidently confirm the composition (C rich, Cu, Al, Pb, mainly Zn).

Sample 2 : Sample 10792

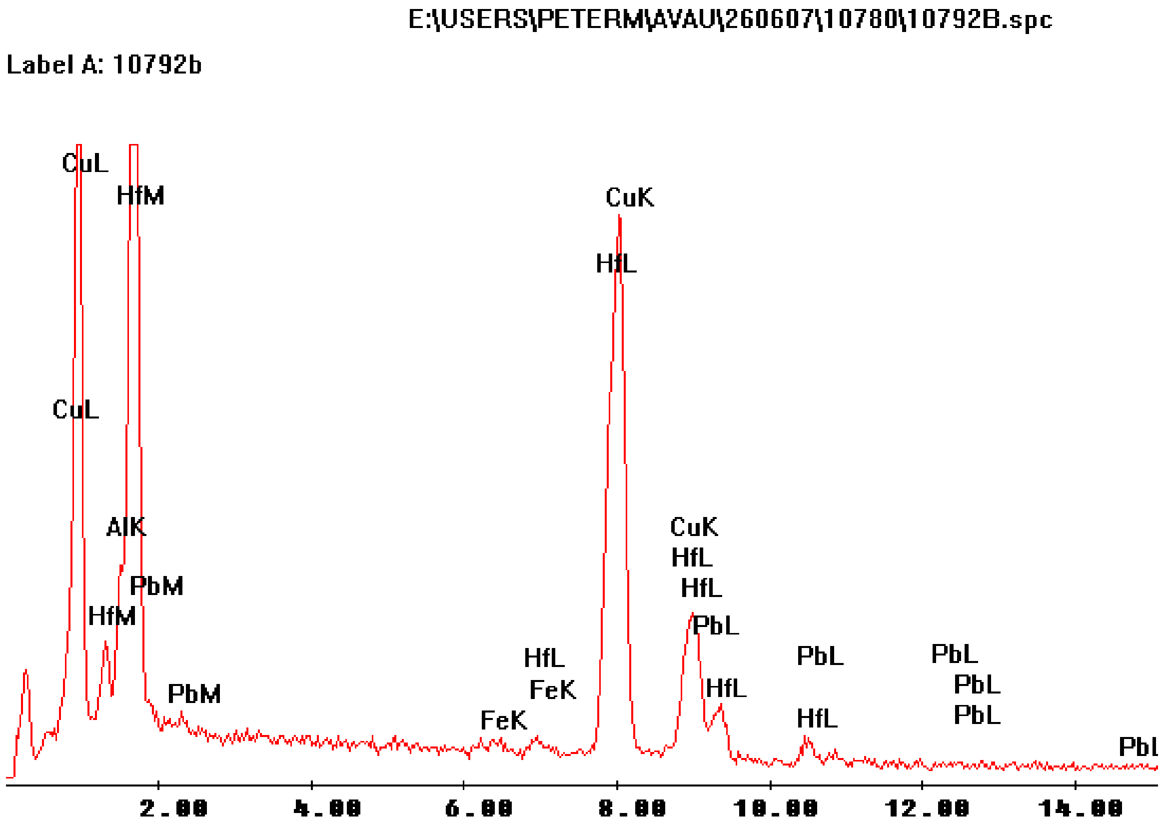


On this sample also it was no problem to identify spots with Pb rich particles.

Detection of Hafnium particle :



The Hf is sitting in a relatively pure form on the Cu particle. The Hf particle is only 1 micron big and can therefore be compared with a smaller particle sitting on the Pb "meteorite" particles.



Sample containing Hf and no Pb (as with all the other samples). The measurement of Hf was overly convincing, with correcpondence of all possible peaks in the spectra. Spectrum shows a shoulder of Al, some presence of Fe, essentially Hf,, Cu also and no Pb.

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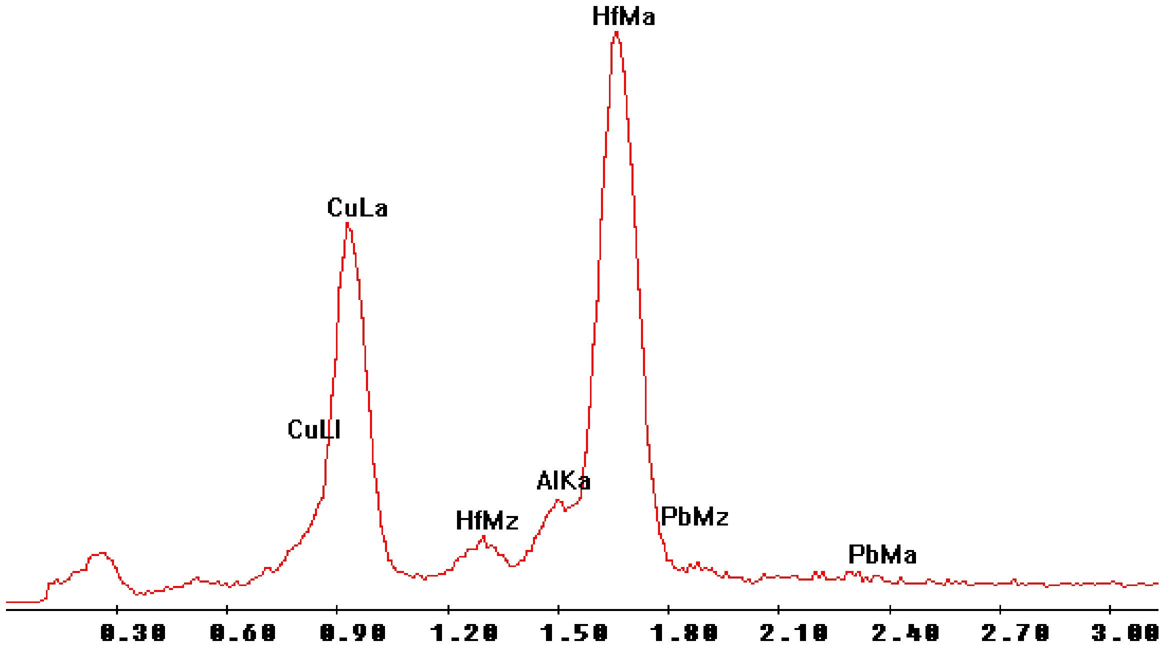
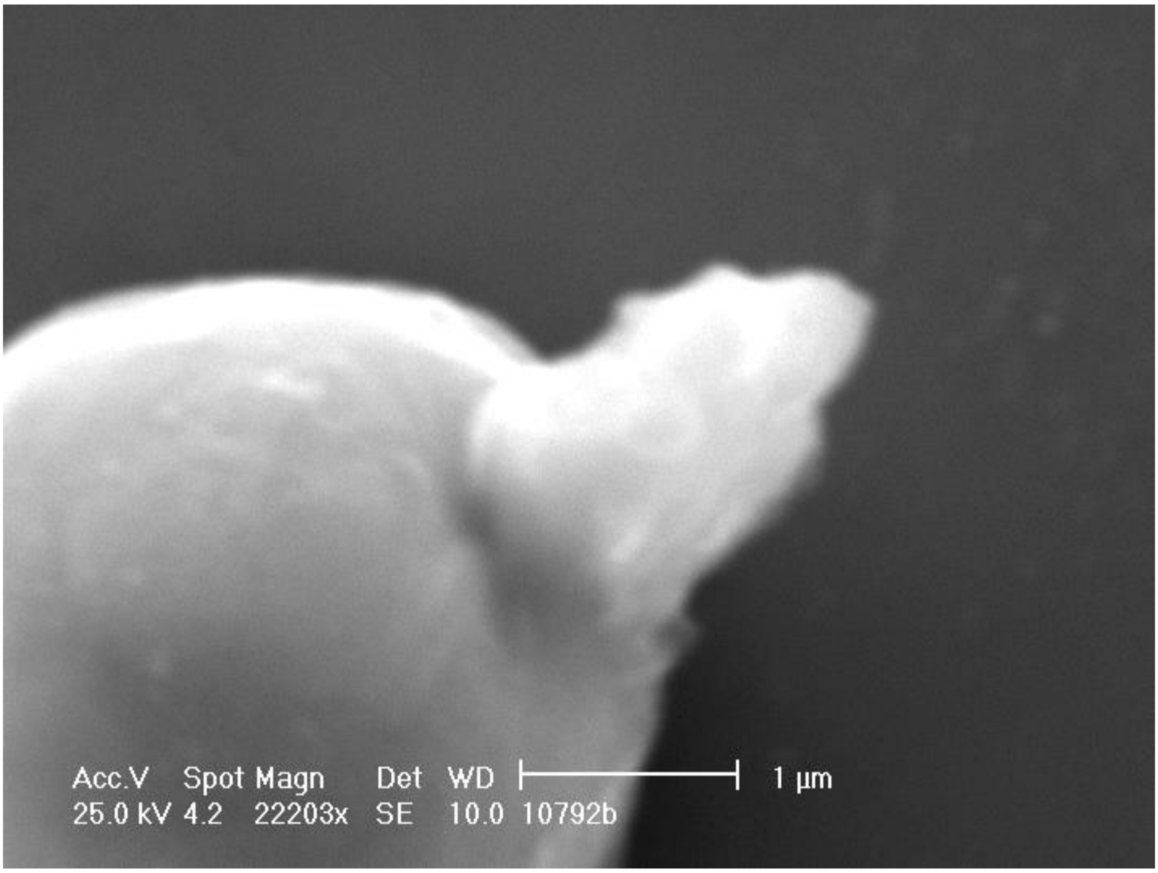
Label A: 10792b





Just a more detailed image in secondary electron mode of the specific Hf particle on top of the Cu ball.

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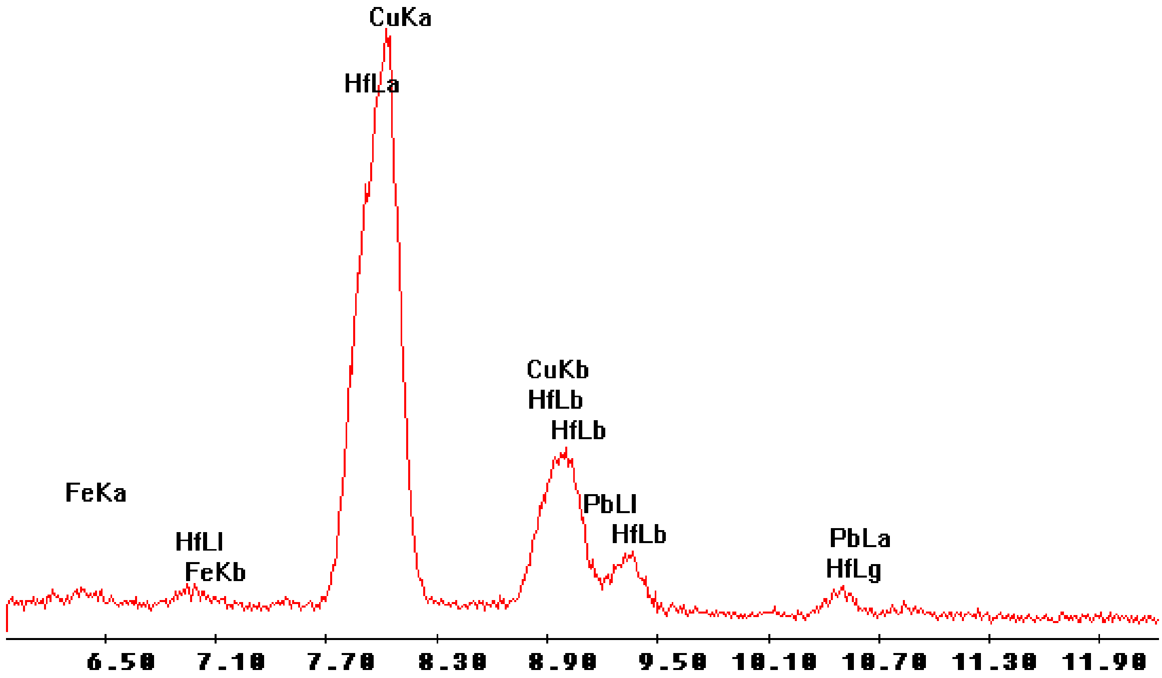
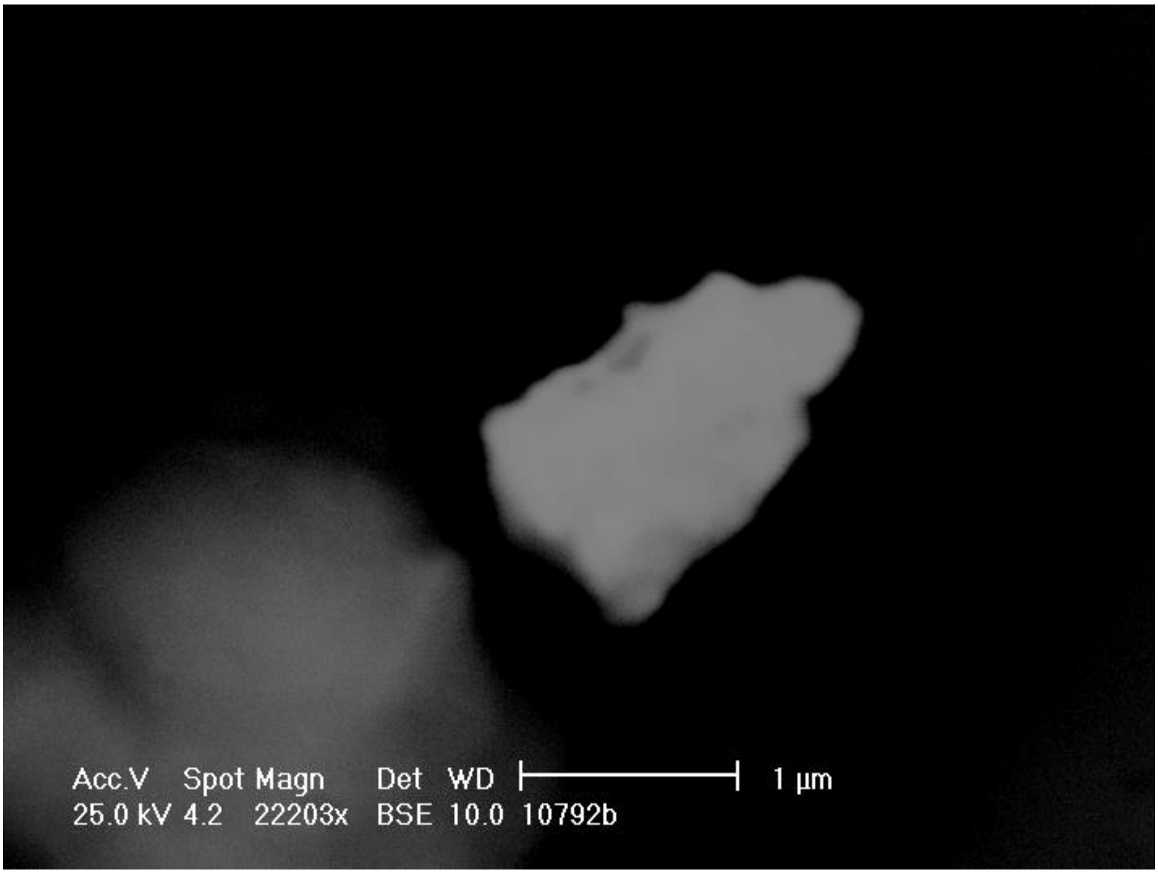
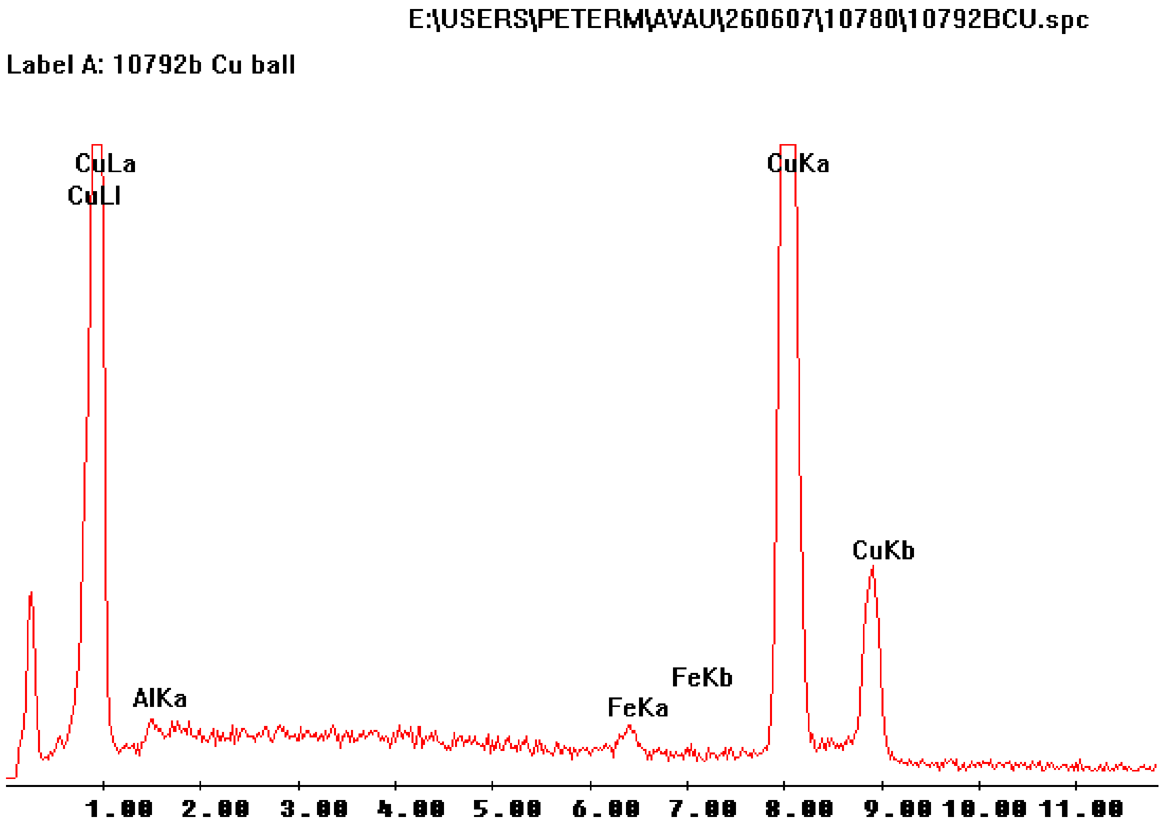
Label A: 10792b



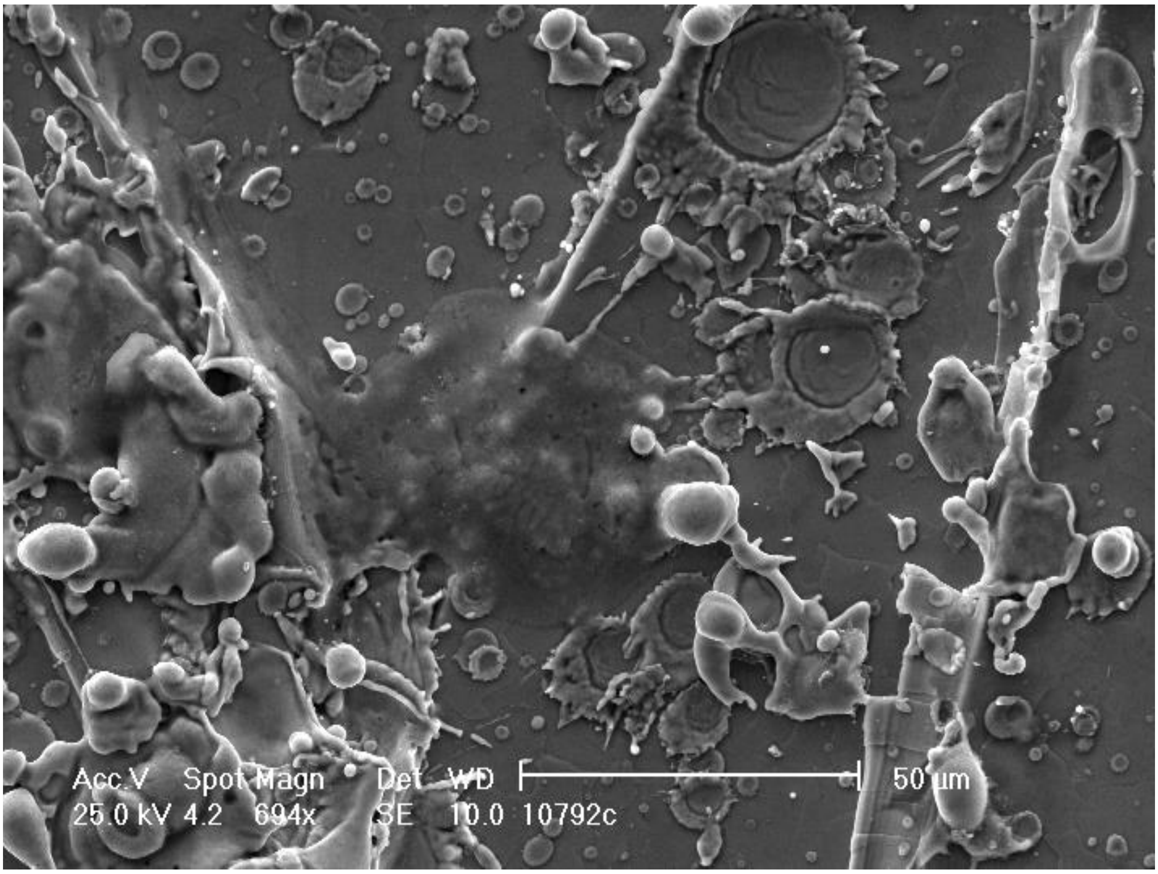


Specific backscattered image of the Hf particle.

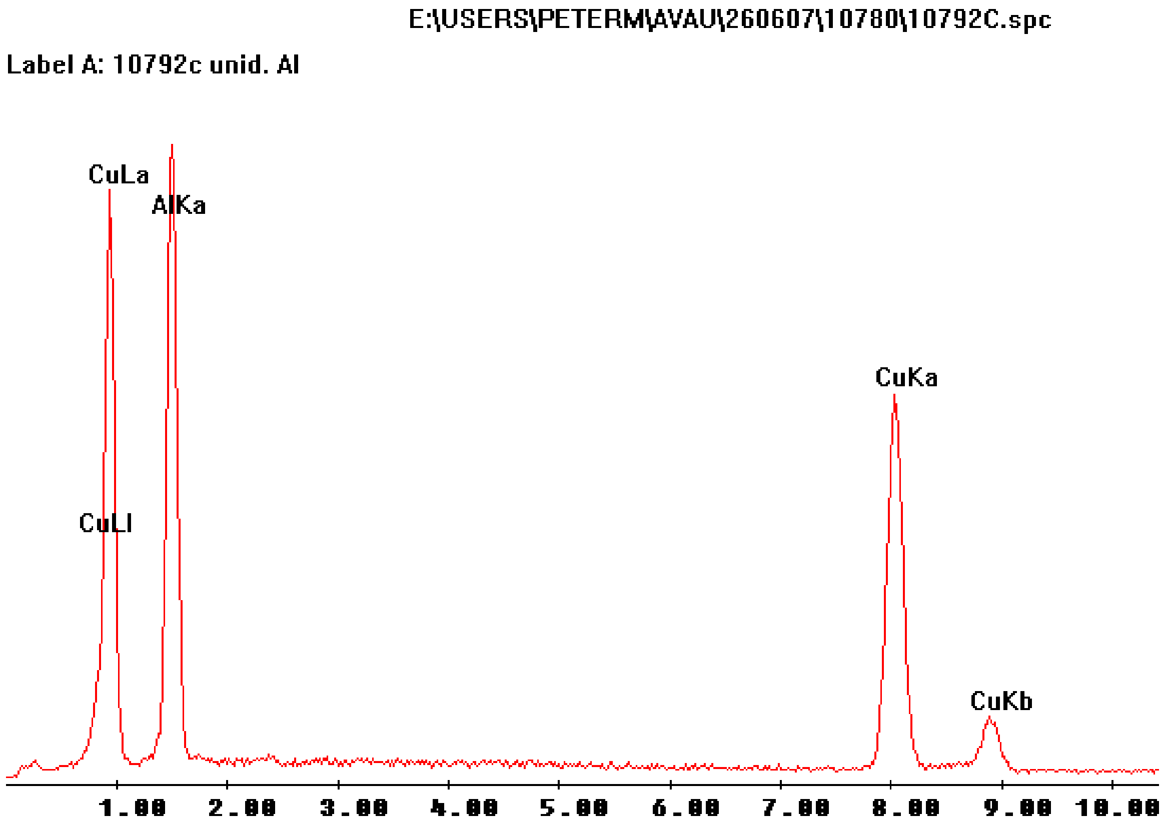


the Cu ball on which the Hf is sitting is essentially Cu, but clearly containing Fe and some Al above the detection limits. It indicates that this Cu is also reflown from the core of the explosion.

Position c on the sample :

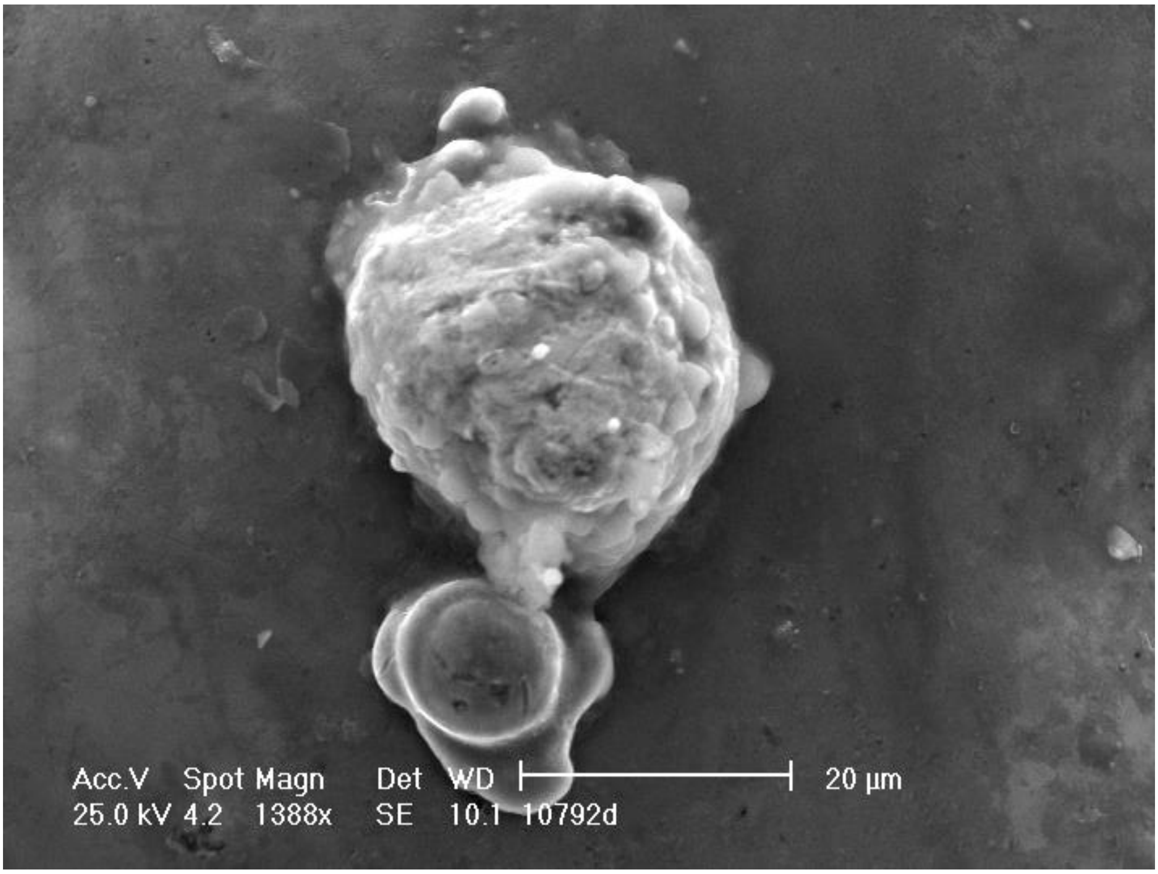


This spot was taken because of the Al splash that is visible and that extends over 50 microns on top of the reflown Cu. We should look into the creation of this sample to get a reasonable explanation for the presence of this Al. It looks as if the detection screen has accumulated both Cu and Al target explosions.

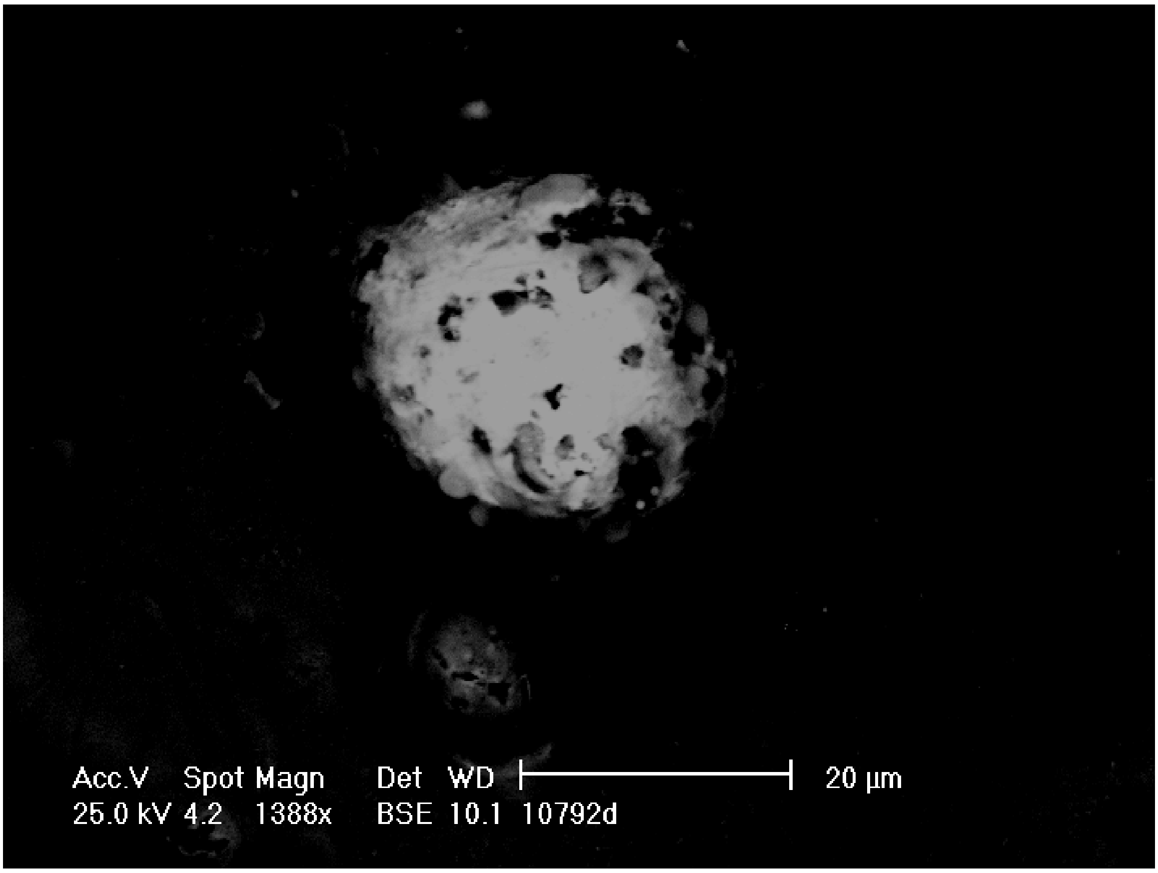


Proof of the composition of the “splash” on top of the Cu layers. Al

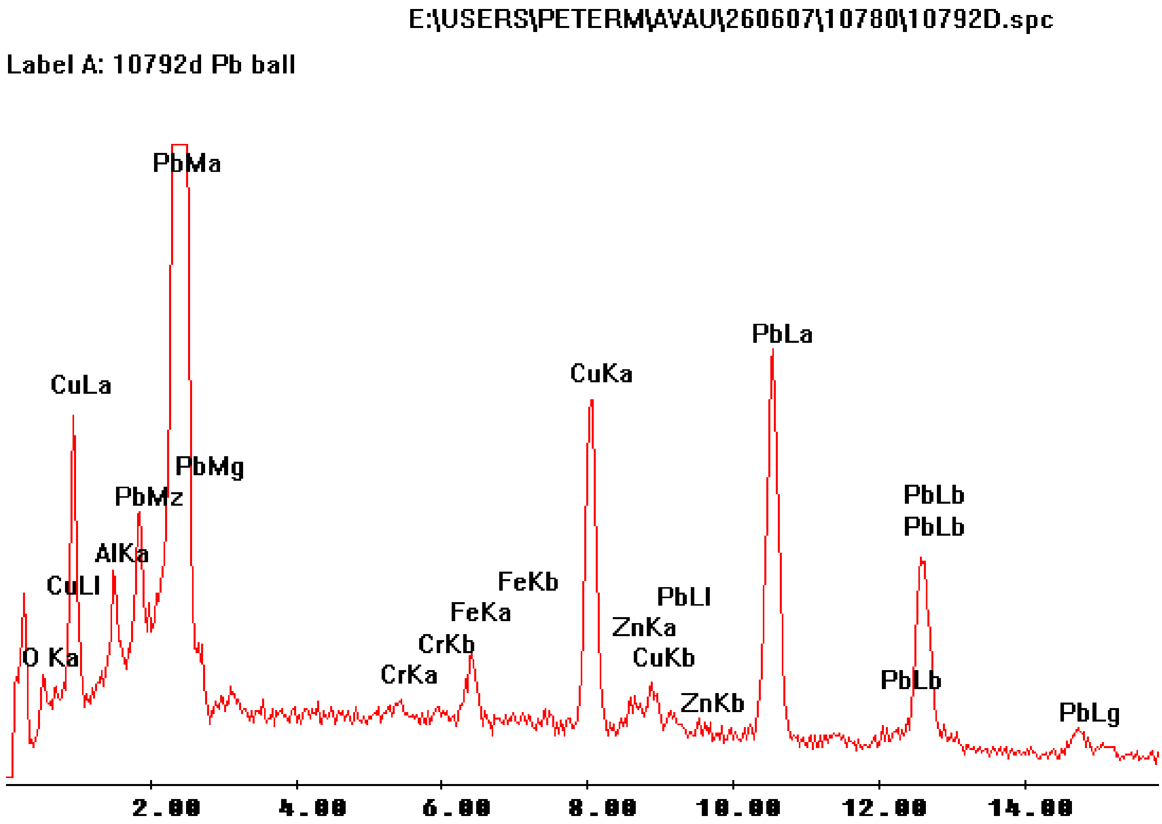
Spot d on the sample :



Some more evidence of the “meteorites” present on the samples. This particle is one of the biggest observed so far : 20 microns. Below the “meteorite” there is again the “flower” in which the “ball” is resting. This is just the Secondary Electron image, not really showing any difference in elemental composition.

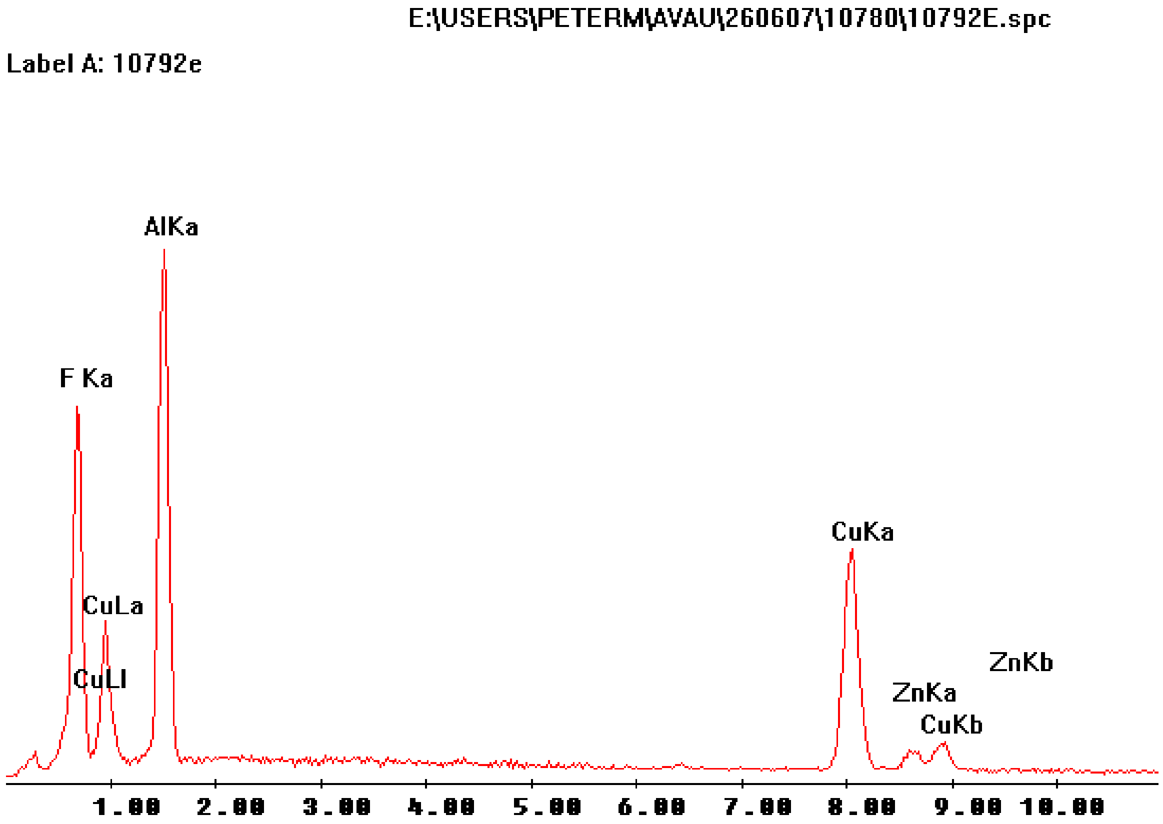


The Back Scattered Electron image shows the differences in mass composition. We are clearly confronted with a Pb ball in a “meteorite” shape.



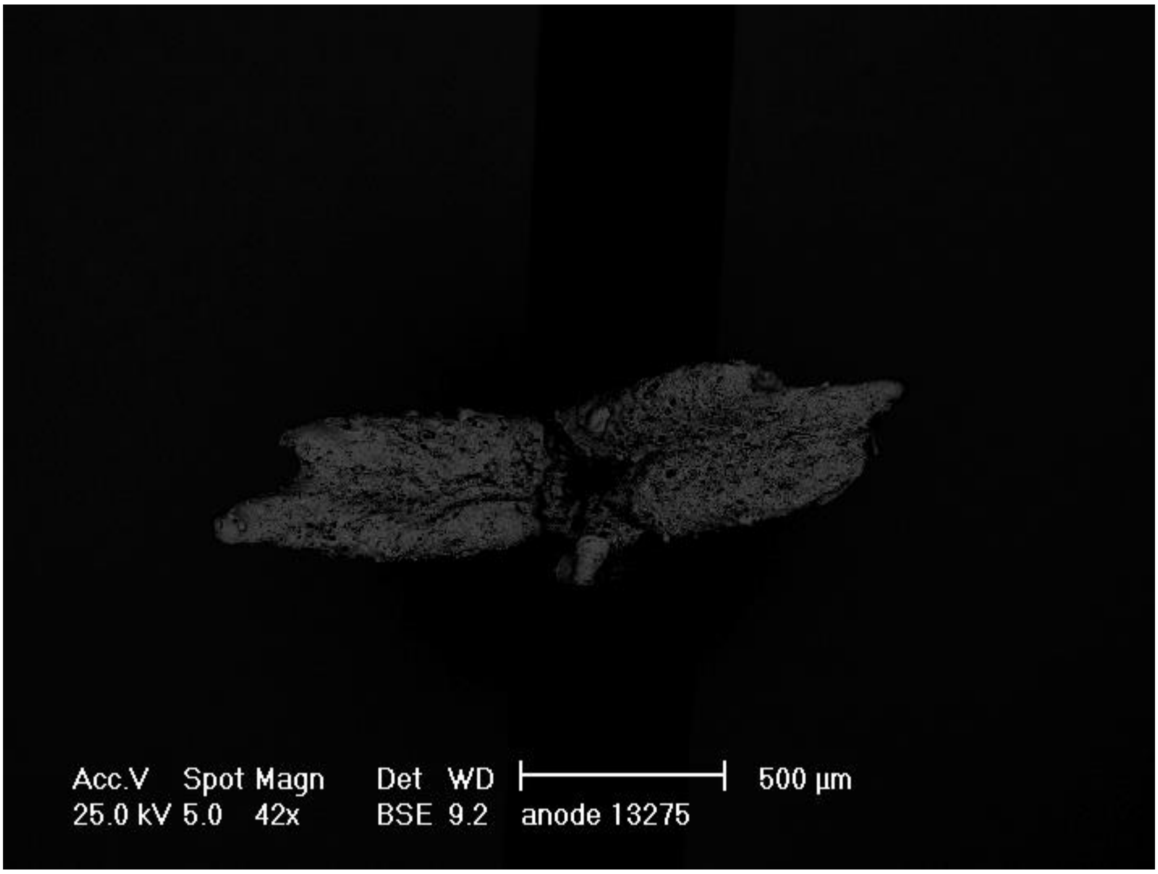
The Elemental composition of the Pb ball is self evident from the spectrum above.
This is another confirmation.

Spot e on the sample :



We have reproduced this spectrum because of the presence of large amounts of Al on some parts of the sample (has the sample been fired with both Al AND Cu ??). This area on the Al is interesting because of the presence of F, which we could not immediately explain in any way.

Sample 3 : fower 1

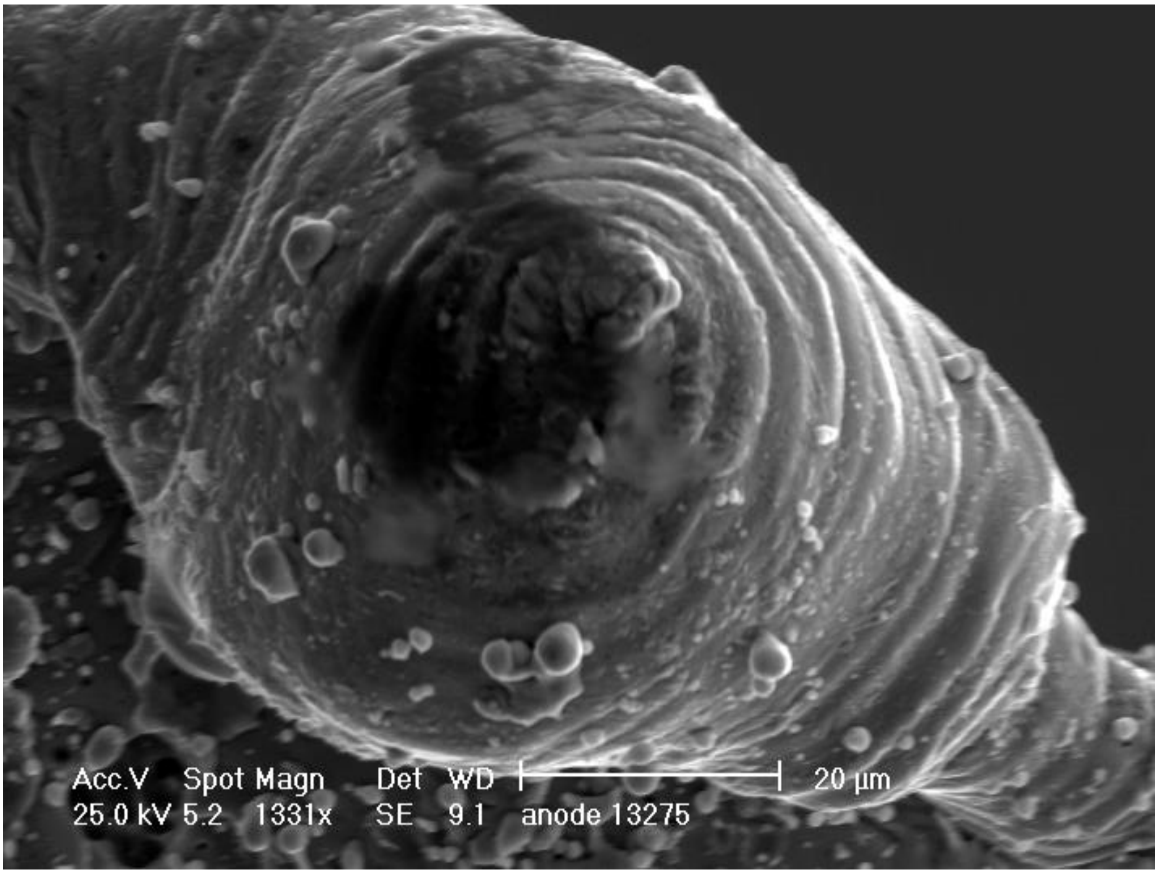


This is the BSE image of the flower after an explosion of the pin.

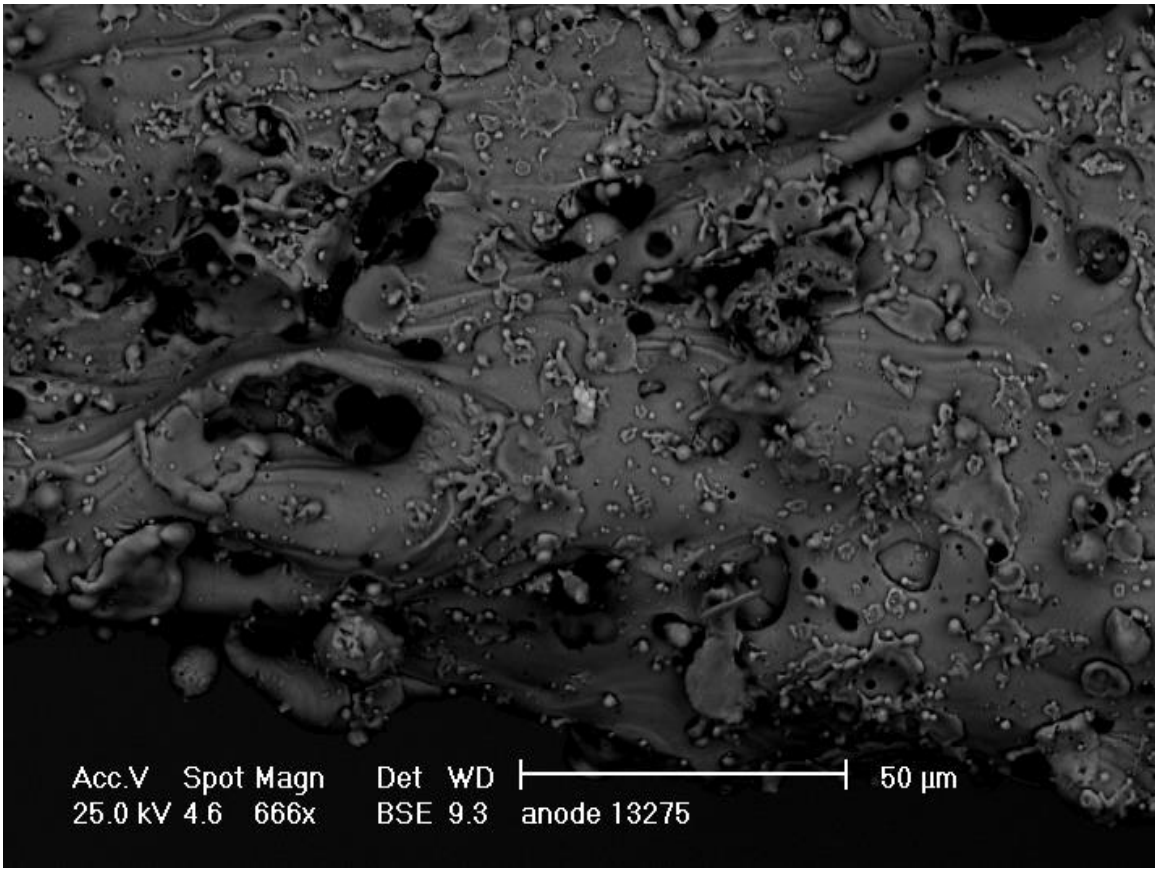
The purpose of the measurements was to find out if we find the similar particles (typically Pb rich, containing Fe, Ni, Zn, Al…) as we find easily on the detection screens.

First observation is that the energy released in the explosion is significant to create such a flower from within just a very small core.

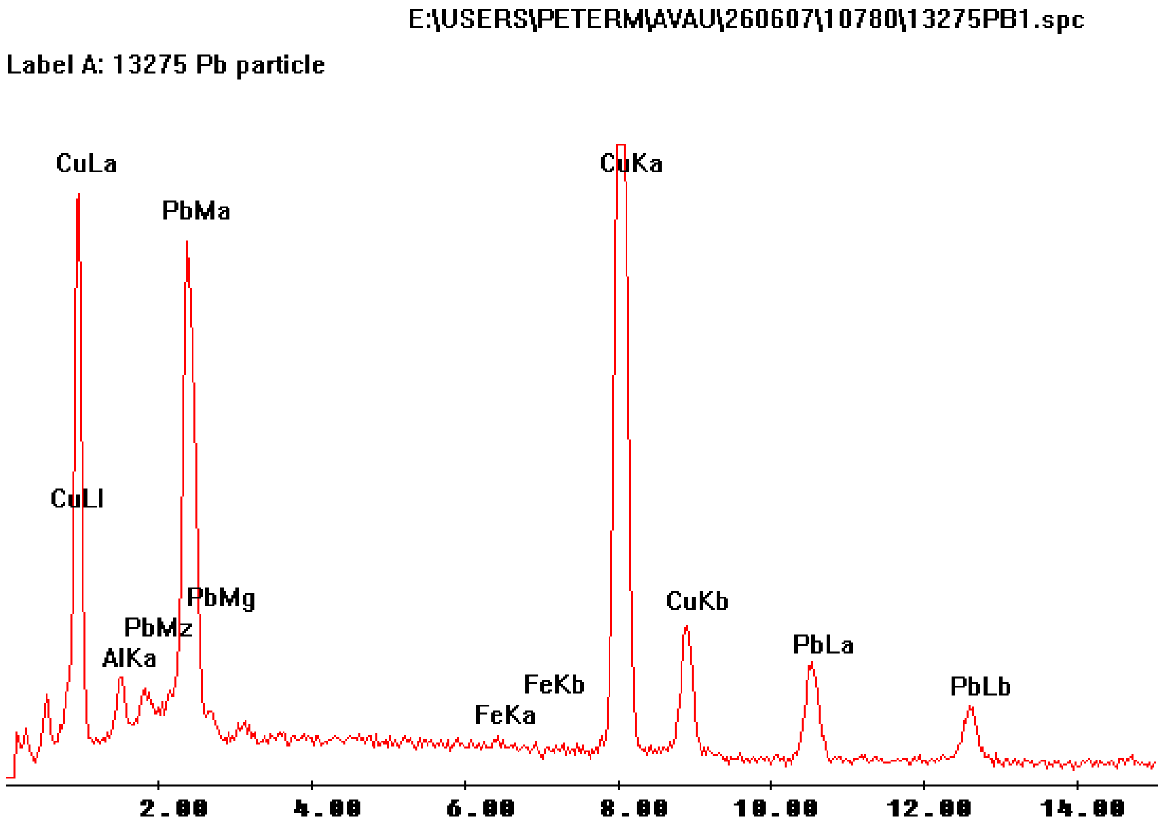
First position on the “flower” :



At the edge of the flower we find a volcano at the point of expulsing the “meteorite” like particle sitting on the top of the “volcano”.



This image shows how, on the flower, the heavier particles can be distinguished. The particle in the very center of the picture (again meteorite shape) lights up.



The presence of Pb rich particles on the flower could be proven.

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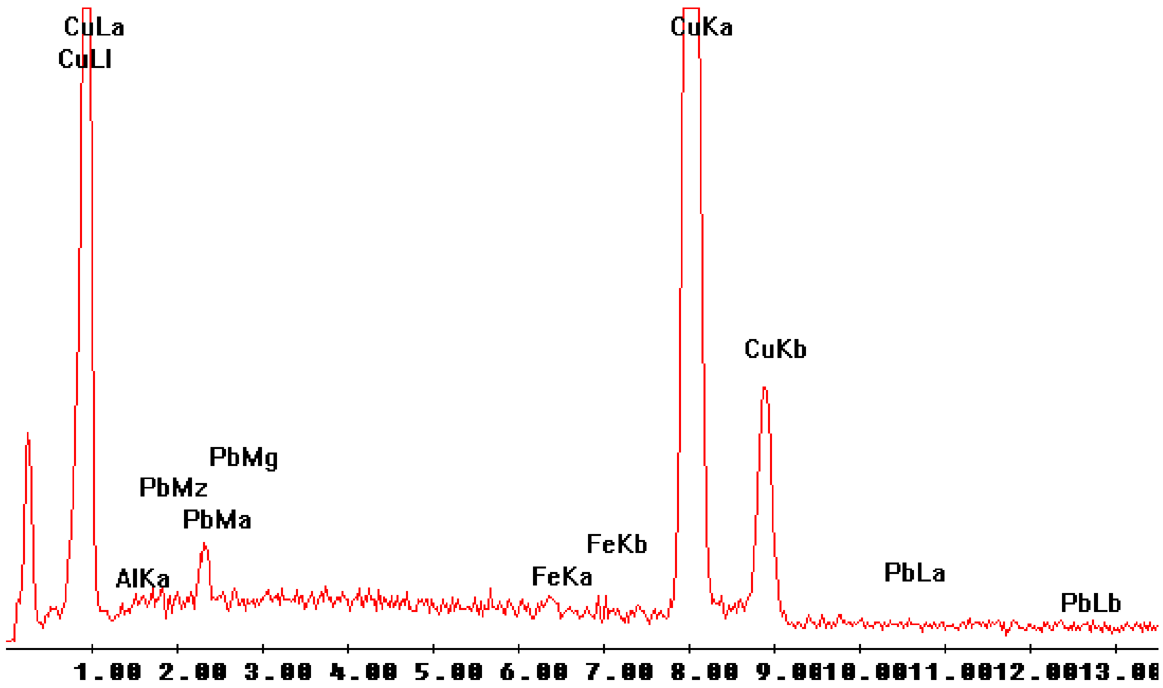
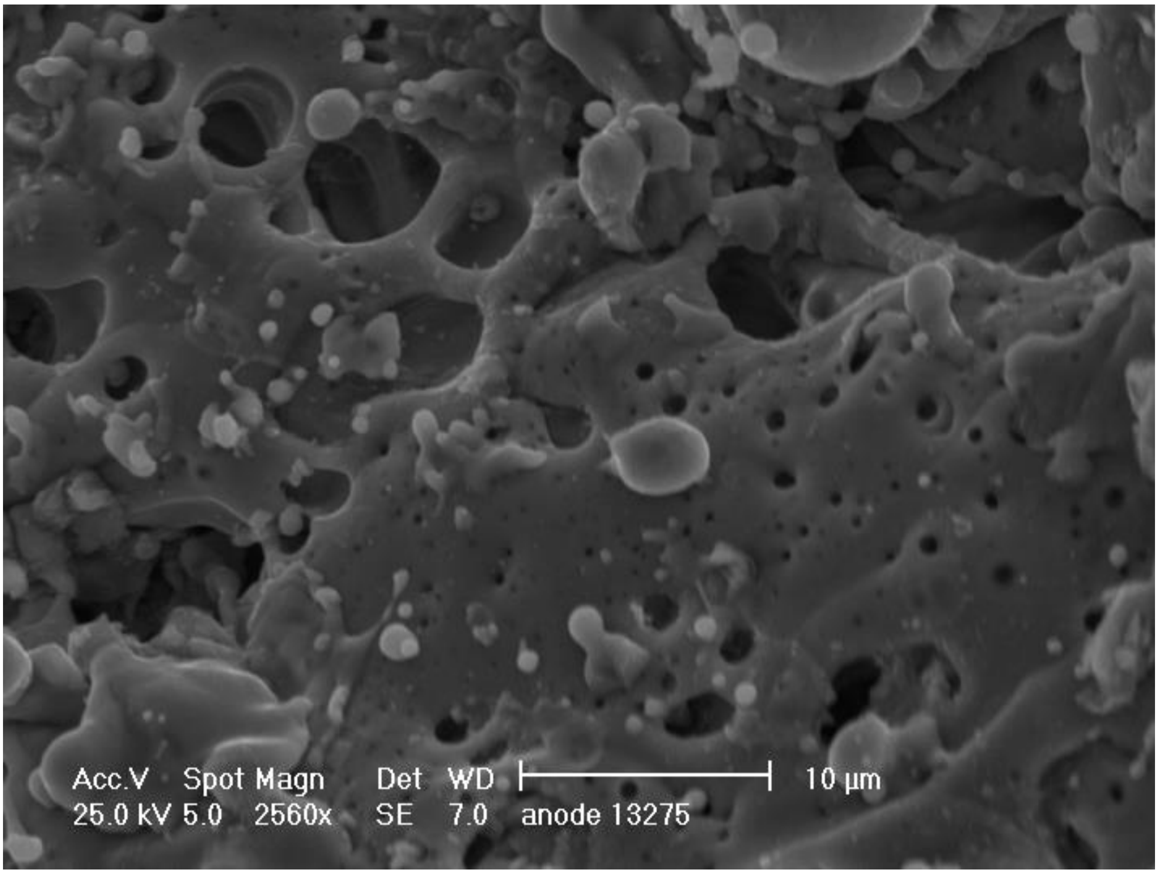
Label A: 13275 rand krater



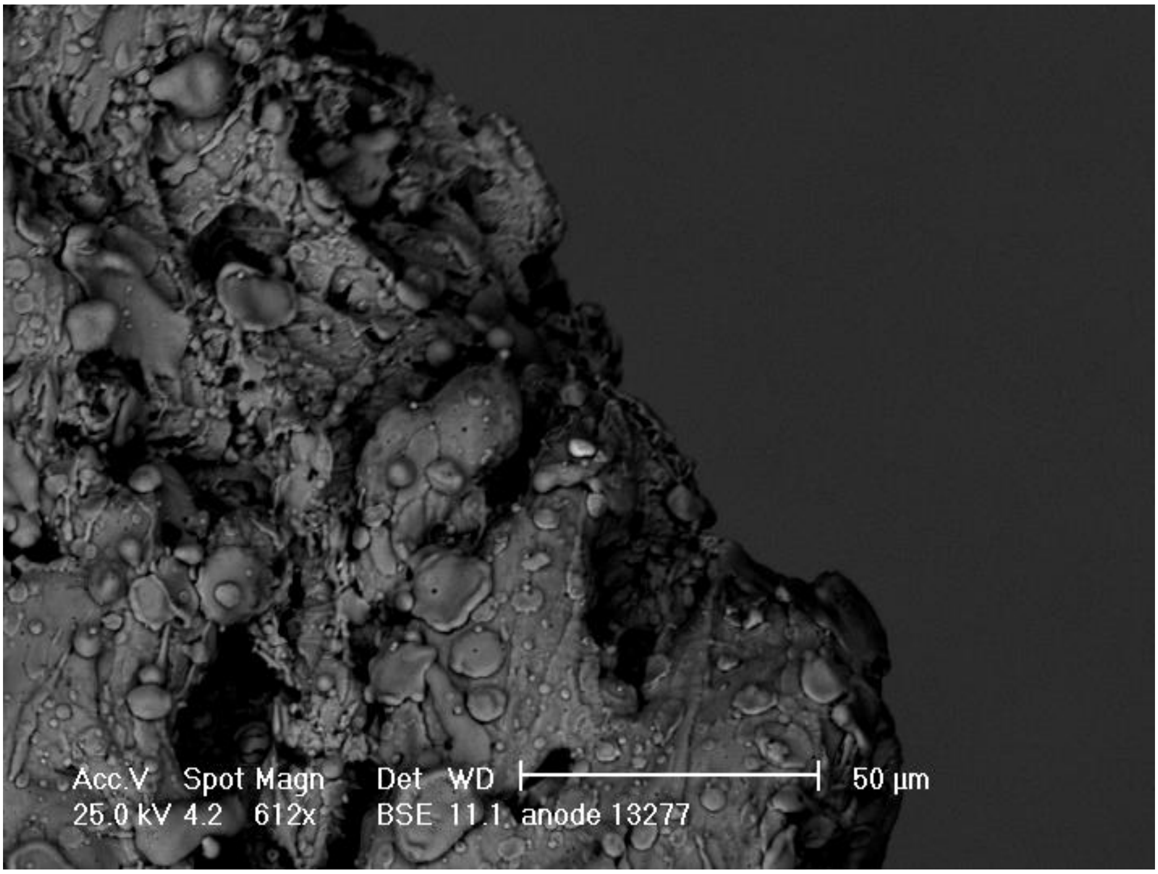
At the edge of the crater.



The reflown material on the “flower” is of exactly the same nature as detected on the detection screen. The same type and shapes of particles can be found. The flower shows clearly melted and solidified Cu with remnants of particle of any kind formed in the core of the pin during the explosion.

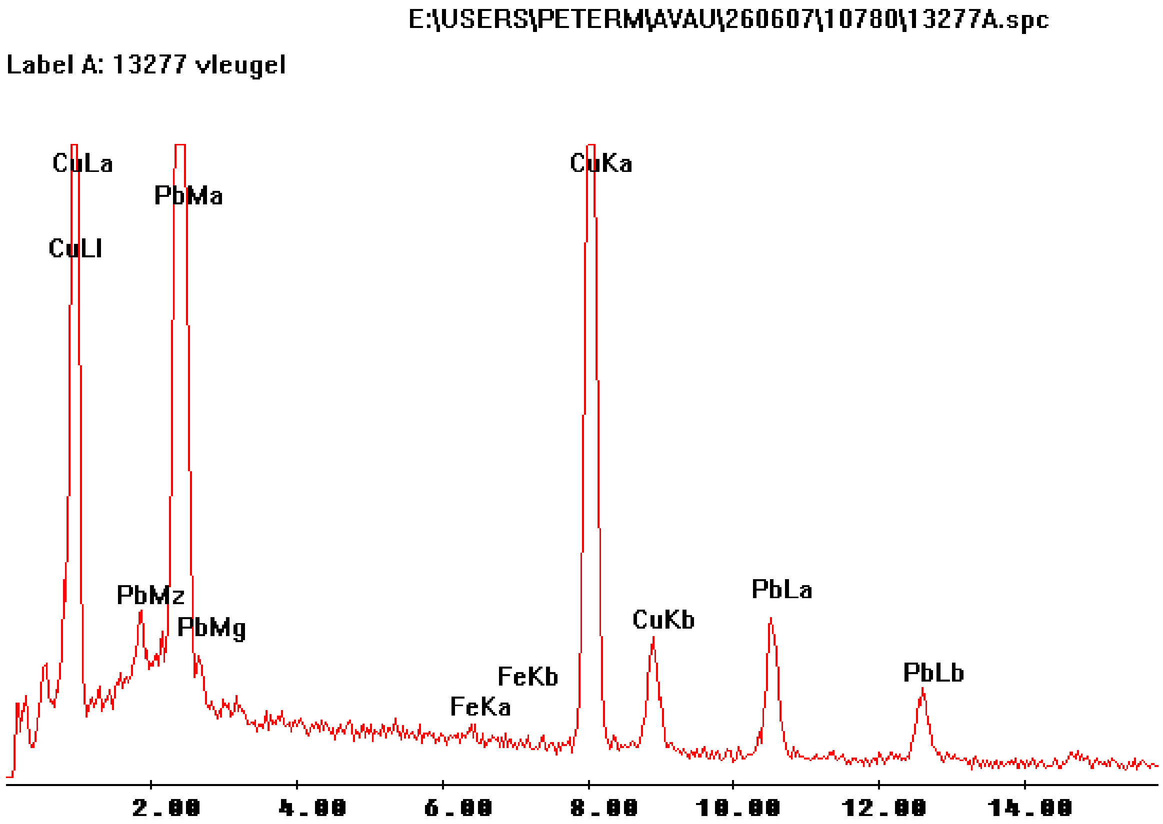
With the confirmation that the detection screen contains the same particles and composition, that both samples of the large machine and the small machine yield the same results, it is proven that the approach of Proton21 to use samples of the small machine (cheaper and easier to produce) are the right technique to come to conclusions in the best possible way.

Sample 4 : flower 2

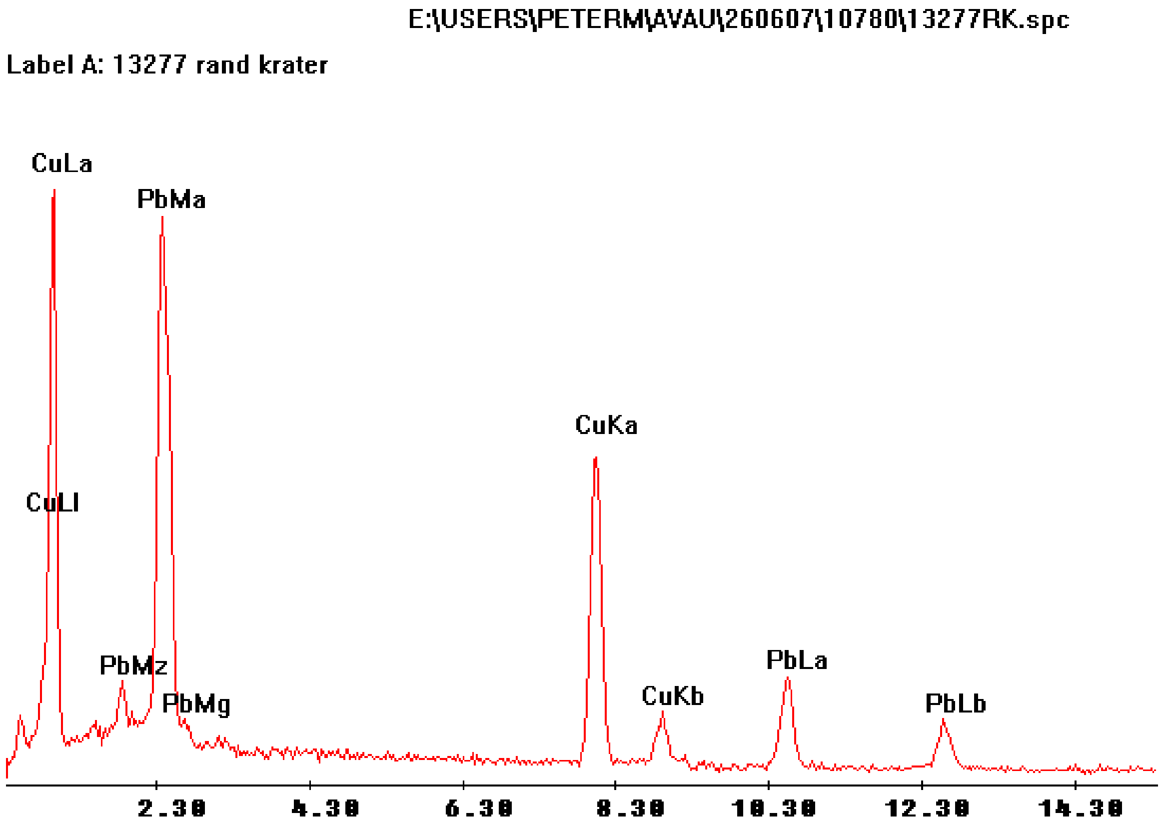


S

Small particle in the middle of the screen sitting at the edge of the "flower". Since there are not that many of those particles it can be concluded that the actual volume of transformation is fairly limited. Given the impact on the pin and the creation of the flower the energy released in the explosion from the (limited) nuclear transformation in the center of the pin is very significant.



Presence of the “classical” Pb and Fe containing particles on the flower.



At the edge of the crater the typical Pb containing particles can be found.

Summary :

- it was easy to reproduce results

- the same “meteorite” like structures can be found on the detection screens

- the density of the “meteorites” increases with distance towards the center (more can be found at the edges of the samples)

- a very pure Hf (Hafnium) particle was detected sitting on top of Cu particle

- repeat measurements confirmed the presence of Hf sitting on the Cu.

- Cu particles have a perfectly round structure, they can be seen as solidified liquid particles spread during the explosion, the “newborn” particles however are very roughly shaped, typically very Pb rich (but also containing other metals in macroscopic quantities to be detected with EDX), containing a variety of new elements.

- the same particles are easily found on the “flower “ which proves their origin from the internals of the “flower”, with subsequent deposition on the detection screen

- the maximum size of the “meteorite” particles is up to 20 microns, the density on the detection screen is rather low, this seems to suggest that the “plasma” in which the transformation is taking place remains rather limited in volume

- analyzing the effect of the explosion on the Cu pin it can be derived that the energy release in the explosion is very significant, given the very limited volume impacted in the core of the target

- the fact that same results are obtained in different machines excludes the possibility of the “new” particles coming from the environment

Conclusion :

- Everything that needed to be proven is proven at the level of nuclear transformation.

- We see the effect of the transformed material, the sample, the detection screen… which shows the very high energy release during the explosion. The transformation is accompanied by tremendous forces. The less material that is actually transformed, the more impressive the energy release during the explosion becomes.