

The undersigned Giuseppe de Bellis, born in Bologna on 13 January 1952, domiciled in Via Aurelio Saffi, 36/5, 44121 Ferrara, Italy certify:

I attended the Enrico Fermi Scientific High School in Bologna and the Mechanical Engineering Course at the University of Bologna. I have been working for Gapmed ltd. for 15 years now. During my work with Gapmed ltd. I have significant and substantial experience of working in the energy field and in particular nuclear and I was responsible for the development and supervision of weak transmutation projects.

I am the inventor of patent application WO2016 / 026720 - EP No. 15749782, filed on 7 August 2015 and granted in Israel and China. I attended the online oral hearing held on November 16 by the examining division.

1) Trials in 2015

I declare that the tests of the invention were carried out in the GE-Hitachi plants in the LENR laboratory, Vallecitos, USA from 12 to 14 December 2015. We have not been able to disclose the relevant information due to confidentiality. The tests were carried out on Co60 radioactive waste. The tests were registered with the n° DBR-002N5918-TSP-01-R2. The test procedure is reported in WI-03-100-32-T326-r27. The results are partially reported in the Vallecitos Extract Report 12-2015 for confidentiality reasons.

To calibrate the equipment, Test A was carried out with non-radioactive Co59 and Test B with a mixture of non-radioactive Co59 and radioactive Co60.

The Hardware included a Device capable of hosting the reaction up to 25 atmospheres of Hydrogen at 400 ° C, an external Chamber that housed the Device and provided for the communication and cooling of the gas, a Collector System that controls the flow of gas between the device, the external chamber and the gas sources and an instrumentation system including sensors. There was also a heater and a 5kV power supply to provide static voltage to the electrodes. The instrumentation system included a gamma monitor and a neutron counter. An inductively coupled plasma mass spectrometer was used for post-test identification of the material.

The mixture of Co59 and Co60 (in salts) was a powder with a granulometry $\leq 6 \mu\text{m}$.

Raney Nickel was present in the device as a $5 \mu\text{m}$ grain size powder.

Inside the chamber of the device, the air was purged with helium. Hence, hydrogen replaced helium. The hydrogen pressure was 9 bar. The heating was turned on. The power supply voltage was set at 130 volts, i.e. 90 V/m and turned on when the temperature measured in the device reached 110 °C. The temperature measured in the device was set to 300 °C. Microwaves were absent.

The conclusion was that a chemical change occurs in the cobalt, the dose rate is lower and the specific activity was 3% lower than the initial in the B1 test and 10% lower than the initial in the B2 test. Co60 has been partially deactivated. Raney Nickel has been predominantly transmuted into Cu.

The geometry of the apparatus and the strong cooling imposed inside the Device made the temperature measurement (carried out by means of a thermocouple, placed near the heater) unreliable. Consequently, a system for verifying the actual temperatures of the treatment environment was set up, based on the internal pressure that was found during the experiment. Functionally at the intensity of the cooling, an average internal temperature is sometimes detected higher than that indicated by the thermocouple.

The following tables summarize the experiments carried out in the United States.

In particular, the first table summarizes (in its first part: 3 + 2 lines) the quantities of material processed (before and after processing) and the preliminary treatments to which the material itself was subjected; the first part of this table reports data referring to both test B1 and test B2. The next ten lines of the same table (from now on referring to test B1) show the radioactive emission values (before and after processing) of the materials used and the relative general average of the cumulative values. The values are reported for the amount of material, for one gram of material and specifically for the radionuclide (Co-60) used. The last five lines highlight the difference (reduction) in radioactive emissions found after the materials have been processed.

The second table, in analogy with the previous one, reports in the first ten lines the values of radioactive emissions (before and after processing) of the materials used (in test B2) and the relative general average of the cumulative values; also in this case the values are reported for the quantity of material, for one gram of material and specifically for the radionuclide (Co-60) used. The last five lines show the difference (reduction) in radioactive emissions found after the processing of the materials in test B2.

	Unreacted (UR)	Post Test (PTB1)	Unreacted Test 2 (UR)	Post Test (PTB2)					
Sample Weight	2.059	1.35	2.01	1.20					
Disolved in 50 ml of	water	nitric		nitric					
diluted with	4% nitric	4% nitric	4% nitric	4% nitric					
10 ml diluted by a factor of 2									
for mass spec diluted again to 1 in 2,500 (two 1 in 50 steps)									
	UR-1	UR-2	UR-3	UR ave	PTB1-1	PTB1-2	PTB1-3	PTB1-ave	
g of material	0.31	0.31	0.3		0.3	0.3	0.29		
uCi/measured sample	3.82	3.57	3.44		4.97	4.95	4.21		
uCi/sample	1.91	1.785	1.72		2.485	2.475	2.105		
uCi/g sample	6.16	5.76	5.73		8.28	8.25	7.26		
uCi (in sample weight)	12.69	11.86	11.80	12.12	11.18	11.14	9.80	10.71	
ug/liter Ni	18301	17096	16499		25517	27283	22792		
ug/liter Co	553140	507594	491586		745596	752197	607844		
g Co/sample	0.11	0.10	0.10		0.15	0.15	0.12		
g Co/ (sample weight)	0.73	0.67	0.67		0.67	0.68	0.57		
ug/liter metal	571441	524690	508085		771113	779480	630636		
									% reduction
g metal/sample	0.11	0.10	0.10		0.15	0.16	0.13		
g metal / (sample weight)	0.76	0.70	0.70		0.69	0.70	0.59		
uCi/g Co	17.27	17.58	17.49	17.4	16.66	16.45	17.32	16.8	3.65
uCi/g metal	16.71	17.01	16.93	16.9	16.11	15.88	16.69	16.2	3.89
uCi/(sample weight)	16.71	17.01	16.93		16.11	15.88	16.69		

Figure 1: Test B1 results.

					PTB2-1	PTB2-2	PTB2-3	PTB2-ave	
g of material	0.31	0.31	0.3		0.3	0.3	0.3		
uCi/ml	3.82	3.57	3.44		5.32	5.02	5.01		
uCi/sample	1.91	1.785	1.72		2.66	2.51	2.505		
uCi/g sample	6.16	5.76	5.73		8.87	8.37	8.35		
uCi (in sample weight)	12.69	11.86	11.80	12.12	10.64	10.04	10.02	10.23	
ug/liter Ni	18301	17096	16499		27676	25549	26999		
ug/liter Co	553140	507594	491586		851309	790440	805682		
g Co/sample	0.11	0.10	0.10		0.17	0.16	0.16		
g Co/ (sample weight)	0.73	0.67	0.67		0.68	0.63	0.64		
ug/liter metal	571441	524690	508085		878985	815989	832681		
									%
g metal/sample	0.11	0.10	0.10		0.18	0.16	0.17		reduction
g metal / (sample weight)	0.76	0.70	0.70		0.70	0.65	0.67		
uCi/g Co	17	18	17	17	15.62	15.88	15.55	15.7	10.12
uCi/g metal	17	17	17	17	15.13	15.38	15.04	15.2	10.06
uCi/(sample weight)	17	17	17		15.13	15.38	15.04		

Figure 2: Test B2 results.

The specific activities prior to reaction and after reaction were measured by dissolving the cobalt material and measuring part using gamma spectroscopy and part using ICP-MS. By using the same dilution factors for the before and after material, any errors would be minimized and the ratio of the raw results from the gamma scan divided by the ICP-MS results could be compared, eliminating errors from converting to uCi Co-60 and grams Co.

The report concerning a third test consists of two groups of sheets that identify the test with the materials “before” and “after” the treatment, therefore:

- A in the final summary written by hand there is a consistent reduction of radioactive emissions by Co-60 (-39.394%) and a parallel decrease in the mass of the mass of Co-60 again -19.728%);
- B the comparison between the tables on pages 5 (“before” and “after”) highlights that after the treatment there appears evidence (completely absent before the treatment itself) of existences of Zn-65 to a modest extent, but in any case largely higher (at least four orders of magnitude) than the minimum limits of detection capability of measuring devices;
- C in the “before” report we have on page 3 (confirmed on page 5) the Co-60 at 3.8412 as the level of radioactivity, while in the “after” report we have on page 4 (confirmed on page 5) the Co-60 a 3.2 as the level of radioactivity;
- D as per the legend on page 4, the acronym “fm” is reported next to Co-60, which declares the neutron reaction recognized by the instrument and immediately declared;
- E the signaling appears (underlined several times by Russell ST) of the quantity of nickel produced as a counter-proof that the transmutation has taken place;
- F in addition, on page 3, again of the report, “after” the *decay during collection / acquisition* report appears with the answer *yes*, automatically processed by their assessment and measurement software.

1. The *Triple Californian experiment* Test C yielded the following results made under the same conditions:

Prima - Before		Dopo - After		
Nuclide	Attività - Activity	Nuclide	Attività - Activity	
Co-60	0,384120	Co-60	0,320200	-19,963%
	<i>Assente-Absent</i>	Zn-65	0,003023	-
I-131	0,000468	I-131	0,000434	-7,751%
K-40	0,002646	K-40	0,003796	30,312%
Y-88	0,000928	Y-88	0,000991	6,320%
Ce-139	0,000261	Ce-139	0,000227	-15,117%
Hg-203	0,000400	Hg-203	0,000324	-23,409%
	0,388822		0,328995	-18,185%

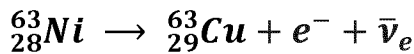
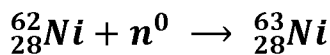
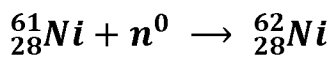
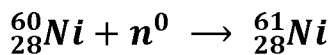
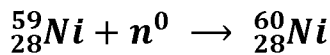
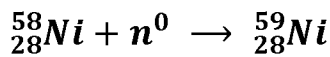
2. Therefore, it is my opinion that the further *Triple Californian experiment* shows that:

- the process proves to be fully capable of very significantly reducing the rate of radioactive emissions of different radionuclides;
- the existence of transmutations (isotopic as well as nuclear) is proven with certainty by the appearance (after treatment) of nuclides not present among the products initially prepared.

2) Answers

Among the hypotheses provided ${}^{58}_{28}\text{Ni} \rightarrow {}^{63}_{29}\text{Cu}$ and ${}^{58}_{29}\text{Cu} \leftrightarrow {}^{58}_{28}\text{Ni}$, both plausible, the available data do not allow a strongly prevalent choice, even if the second appears to be somewhat more substantiated.

The progressive transmutation (first isotopic and then nuclear) ${}^{58}_{28}\text{Ni} \rightarrow {}^{63}_{29}\text{Cu}$ could occur for repeated neutron captures and for a decay β^- ($n \rightarrow p + e^- + \bar{\nu}_e$), which causes the change of chemical species. The most likely series is:



Not having suitable equipment for measuring emissions (γ , photons) within the reaction apparatus and being the reaction apparatus itself shielded with lead as a safety precaution, the presumed radiations resulting from the transmutations were not detected.

Neutron captures become explainable with a progressive electronic excess (caused by β^- decays) which can induce particle transmutations in the ${}^1_1\text{H}$ present in the reaction environment ($p^+ + e^- \rightarrow n^0 + \nu_e$) due to hydrogen and electric field.

The ${}^{58}_{29}\text{Cu}$ comes from the transmutation of ${}^{58}_{28}\text{Ni}$. The ${}^{58}_{29}\text{Cu}$ returns to decay – usually in less than a second – in ${}^{58}_{28}\text{Ni}$, giving rise to a rally of transmutations that allows a persistence of the reactions (the presence of the nickel) and a consistent and lasting energy production.

${}^{58}_{29}\text{Cu} \leftrightarrow {}^{58}_{28}\text{Ni}$ can be based on a succession of decays β^- and β^+ , which constitute a cycle of transmutations. The alternation of e^- and e^+ emissions explains the consistent energy production (electron and positron annihilate each other, producing, for each event, at least 1.022 MeV: $e^+ + e^- \rightarrow 2\gamma \leq 1,022 \text{ MeV}$). On the other hand, the constant “reproduction” of nickel that would occur would explain the fact that a low-charge reactor (about 3 grams of transition metals) could continue the process for over four months, supplying appreciable quantities of thermal energy.

Starting from the general terms, it seems plausible to hypothesize that the initiation reactions are series of β^- , which affect the transition metals. The hypothesis is better sustainable if we consider the fact that, in the presence of radioactive materials (of their nature more “prone” to decay), the process is characterized by a more rapid onset, which, in turn, invites us to believe that availability for

transmutation also has intrinsic values in the materials used. The series of β^- , involves a modification of the charge balances (to weigh mainly on hydrogen) between the particles. The neutron excess (which in all probability constitutes the “base” that favors the frequency of neutron capture) becomes explainable with an anomalous availability of protons (still substantially “bound”) and electrons ($p^+ + e^- \rightarrow n^0 + \nu_e$) and, in turn, can explain the frequency – in turn “anomalous” – of the electron captures, which constitute the mechanism that guides the “initial” isotopic transmutations of nickel. The reason for the start of the neutron capture chain has still to be assessed: the justification that appears most plausible is that the atomic and nuclear tensions determined by the energies administered (charge stress, due to electrostatic fields; geometric stretch, due to ultrasounds and energetic tension, due to heat) generate a propensity for isotopic transmutation (the final nuclear transmutation – ${}^{63}_{28}\text{Ni} \rightarrow {}^{63}_{29}\text{Cu} + e^- + \bar{\nu}_e$ – occurs with a “normal” β^- decay)

Speaking of “proton emission” means “availability of protons” since the protons involved (“coming” in great prevalence from ${}^1_1\text{H}$) are particularly available to the transmutation ($p^+ + e^- \rightarrow n^0 + \nu_e$) precisely as a consequence of the modification of the charge equilibrium occurred (due to the β^- series) in hydrogen.

I have taken note of the criminal penalties incurred by the author of a false certificate.

Made to serve and assert what is right.

Done in Ferrara, on May 12, 2022

Full name and signature:

Giuseppe de Bellis

A handwritten signature in black ink, appearing to be 'G. de Bellis', with a stylized, flowing script.