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Conceptualized Brown Gas Generator to Transmute Tritium and to Mass-Produce Helium-3

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Abstract:- I would like to propose the development of a conceptualized brown gas generator, which is the transmutation reactor to produce brown gas.

Brawn gas generator transmutes the nucleus of H_2O with femto-H_2 generated at anode metal electrode of metal with FCC lattice structure. Cold Fusion occurs at the space site (T-site) on the metal surface with FCC lattice structure and with nano-roughness. Because femto-H_2 has covalent electron in deep electron orbit at a few femto-meters from the nucleus. In case of femto-D_2, the covalent electron in deep orbit can shield the coulomb repulsive force to cause Cold Fusion. In both cases, covalent electron in deep orbit shields the coulomb repulsive force between femto-H_2 or femto-D_2 and target nucleus, thus femto-H_2 and femto-D_2 fuse with target nucleus. For femto-H_2, transmute the nucleus of H_2O as follows. Note that 2p is femto-H_2.

H in H_2O; $p+2p={}^{3}_{3}Li={}^{3}_{2}He$ (electron capture)

T in T_2O etc. ;$ {}^{3}_{1}T+2p={}^{5}_{3}Li={}^{4}_{2}He$ (proton emission)

O in H_2O; $ {}^{16}_{8}O+2p={}^{18}_{10}Ne=>{}^{18}_{9}F=>{}^{18}_{8}O$ (electron capture)

Because of the larger size of tritium than proton, the transmutation of tritium is faster than proton to reduce the tritium concentration in tritium contaminated water.

Helium-3 and Oxygen-18 can be collected by burning brown gas in hydrogen gas turbine, which generate power to sell and collected gases are to be sold for industrial or medical use. Thus, large scale brown gas generator will bring a huge profit to industrial activities.

Mr. Ohamas invented his own brown gas generator and he names the generated brown gas, OHMASA gas, or is called HOO gas. His experiments in his patent clearly show the reduction of radioactivity due to the tritium transmutation, however, the application of his gas and his transmutation of tritium seems that has not been achieved.

Since I discovered the mechanism of his transmutation of tritium, I would like to report his achievements and my transmutation mechanism to the governments' officials and researchers around the world.

In order to improve the transmutation rate further, I would like to propose the new conceptualized brown gas generator based on the femto-H_2 transmutation mechanism. Faster speed of H_2O across the femto-H_2' trajectory of movement is needed and slower speed of femto-H_2 is also necessary.

Ohmasa's generator has vertical vibration of the lateral metal plates, which makes femto-H_2 goes out of the metal grain boundary due to inertia force, and femto-H_2 slows down by gravity above the metal plate, which improves the transmutation rate, however the vertical motion of lateral metal electrode creates the vertical motion of H_2O, which cannot improve the transmutation rate.

The conceptualized brown gas generator has the H_2O vibration mechanism to OHMASA gas generator. In a midpoint between metal plates, femto-H_2 speed becomes slower, and H_2O vibrates laterally and faster to improve transmutation rate.

Keywords:- *Brown's Gas, HHO, Transmutation, Cold Fusion, femto-H_2, femto-D_2, Oxygen Hydrogen Combustion Turbine, Brown Gas, Helium-3, Oxygen-18, OHMASA Gas,*

I. INTRODUCTION

Enormous amounts of tritium are being discharged from nuclear power plants all around the world.

France's La Hague site has the world's largest emissions of 11,400 trillion Bq, Canada's Darlington nuclear power plant has 220 trillion Bq, and South Korea's Gori nuclear power plant has 91 trillion Bq.

At the time when tritium concentration regulations were decided, there was no cheap way to remove tritium, and a few countries owned nuclear power plants, so I think the decision was made based on optimistic predictions that it would be safe to discharge some amount into the vast sea.

At present, transmutation of tritium was experimentally proved by Ohmasa in Japan, and the author has shown the mechanism of transmutation and propose the improved brown gas generator which is the transmutation reactor with femto-H_2.

Thus, now is the time to develop a large-scale brown gas generator to transmute tritium to helium-4. Brown gas generator can produce helium-3, oxygen-18 which can be collected after burning brown gas and its burning generate power, and produce helium-3 and oxygen-18, which are rare element to be sold in the market. Therefore, running costs of large-scale brown gas generator are extremely low and contribute to the industry.

Brown gas generator can remove radioactive elements in contaminated water from the Fukushima nuclear power plant can be transmuted to the safer elements.

Author would like to report Ohmasa's achievements to government officials and researchers around the world, with my interpretation of transmutation based on Cold fusion to develop the improved large-scale brown gas generator.

Brown gas generator is the transmutation reactor which can generate noble metals as is shown in Ohmasa's patent, which mechanism will be reported separately.

II. BACKGROUND

A. *Femto-H_2 and Femto-D_2 Creation on Metal Surfece with Nano-Sturucute[1],[2]*

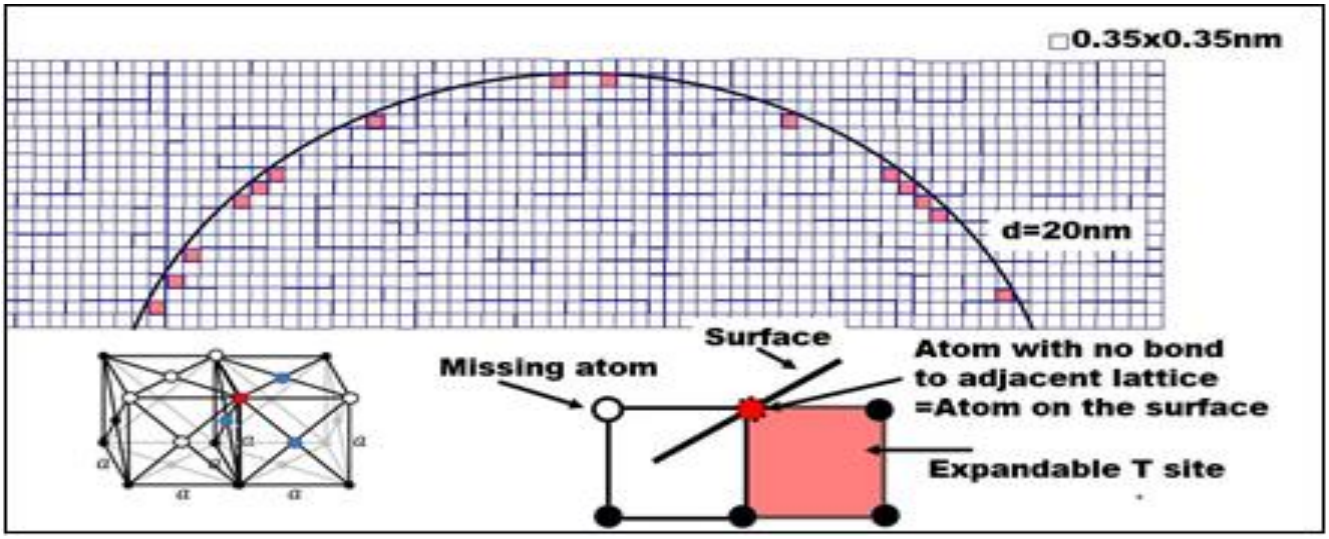

Fig 1 Expandable T Site on Nano-Roughness of Metal [2]

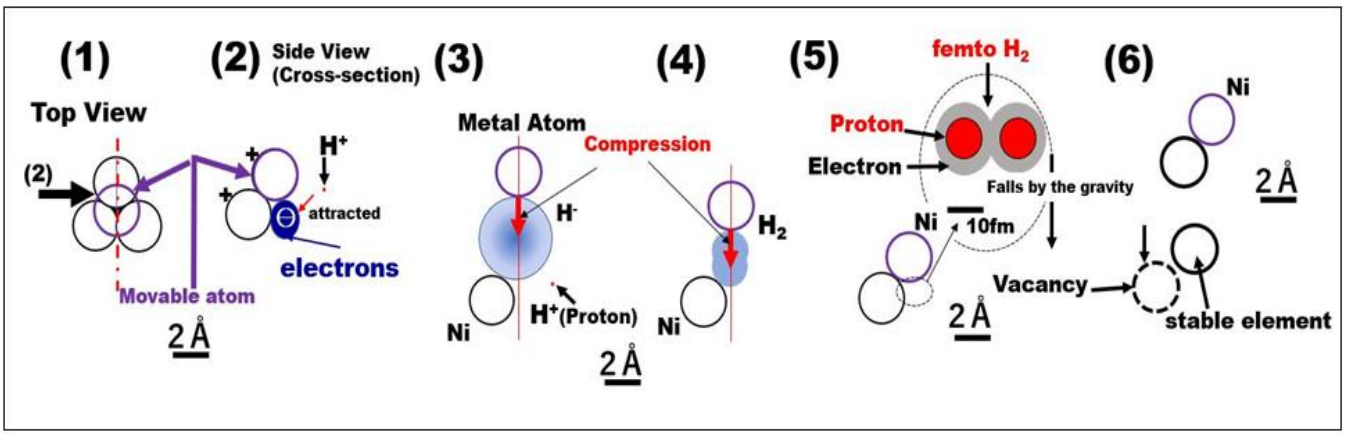

Fig 2 Creation of Femto-H_2 with H_2 Gas Loading to Metal [2]

Cold Fusion occurs on the surface of metal with FCC lattice structure and with nano-roughness. On such surface metal has the space T site which vertex atoms have no bond to the atoms in the adjacent lattice. Author calls it expandable T site because it can be expanded by occupation of the negative hydrogen which size is larger than T site size.

As is shown in Fig2(2), the center of T site is negatively charged because metal atom tends to be positive emitting electron to the center of T site. Therefore, negative T site attracts positive hydrogen to be negative hydrogen at the expanded T site, and negative hydrogen expands the expandable T sites. Due to the negative charge of negative hydrogen at expanded T site, which attracts positive hydrogen, and is joined to be H_2 at the expanded T site. By compression of H_2, covalent electron of n=1 is transitions to deep electron orbit, to be femto-H_2.

In Fig.2 if D_2 gas is used, femto-D_2 is created, and electron in femto D_2 is at a few femto-meters from the nucleus to shield the coulomb repulsive force to occur Cold Fusion.

B. Expanded T Site and Femto-H_2 Cause Hydrogen Embrittlement[3]

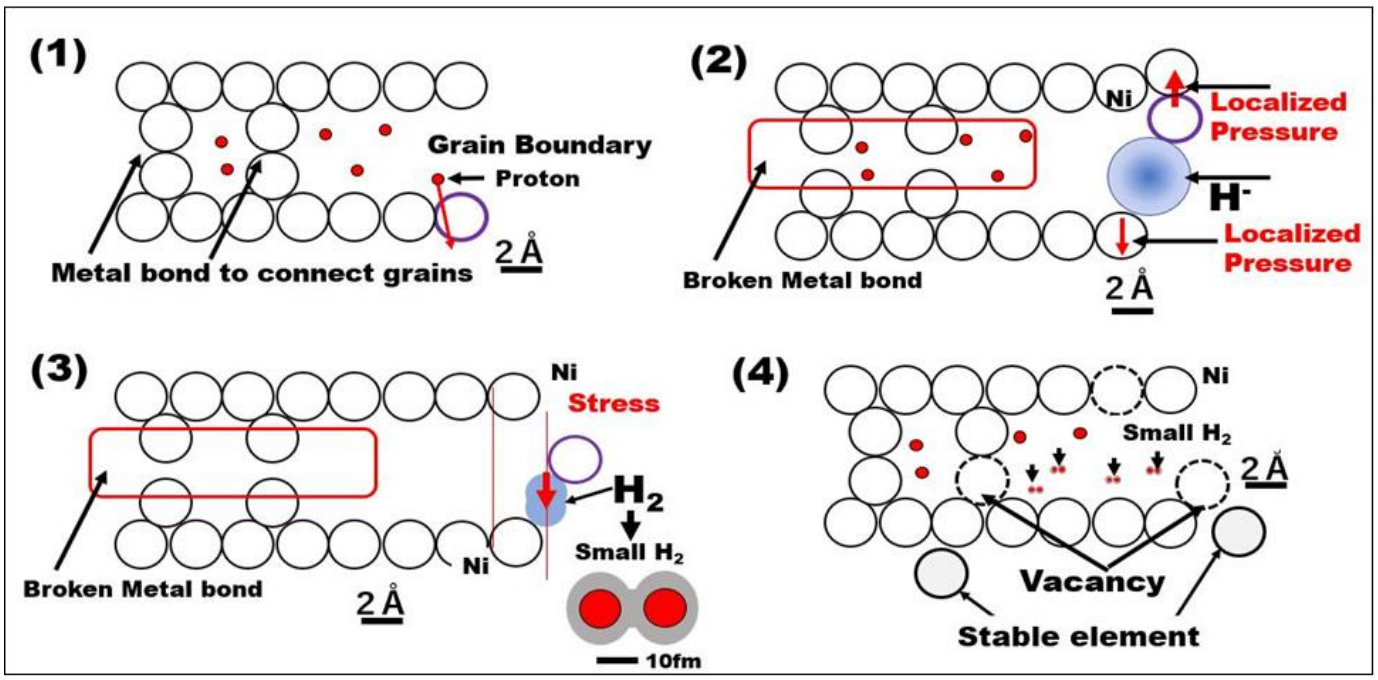

Fig 3 Mechanism of Hydrogen Embrittlement; (2) Low Temperature Hydrogen Embrittlement, (4) High Temperature Hydrogen Environmental Embrittlement

As is shown in Fig3(2), expanded T site breaks the metal bond to connect grains, to cause hydrogen embrittlement. And as is shown in Fig.3(4) femto-H_2 created at expandable T site transmute metal to ne other metal to cause point defects, and this embrittlement can occur at temperature around 700 ℃, due to the thermal vibration of metal atoms.

Therefore, hydrogen embrittlement is consistent with cold fusion mechanism and femto-H_2 transmutation mechanism.

C. Femto-H_2 Creation at the Grain Boundary[4]

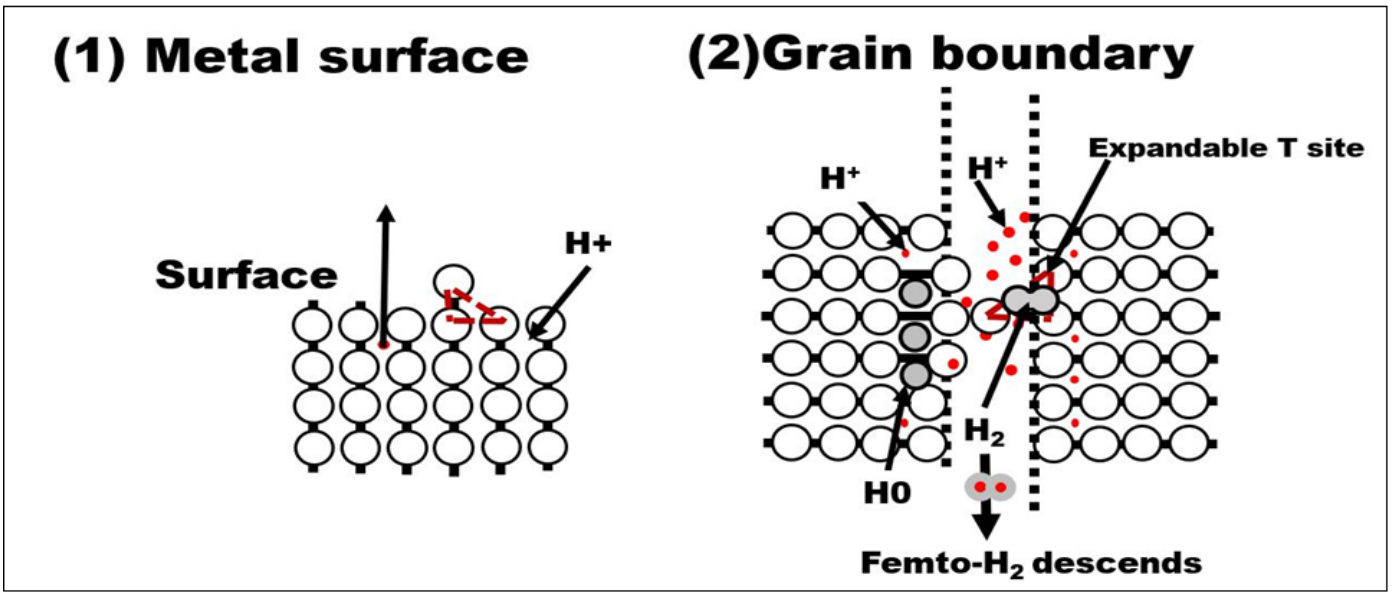

Fig 4 Creation of Femto-H_2 at the Grain Boundary

With positive metal voltage, very large number of hydrogens exists as a proton at the narrow space of grain boundary for hydrogens to be segregated. The grain boundary sidewall surface with nano-roughness has larger number of expandable T site.

Therefore, at grain boundary larger number of femto-H_2 is generated.

D. Positive Voltage for Cold Fusion[5]

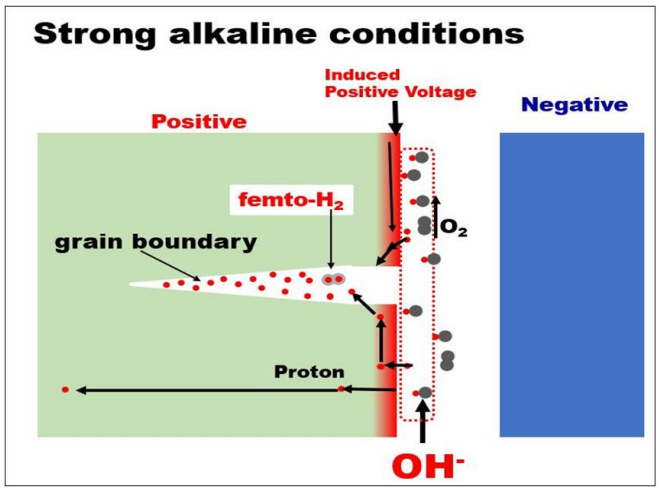

Fig 5 Positive Metal Voltage in Strong Alkaline Aqueous Solution

Cold Fusion occur on the metal surface with the positive voltage because center of the expanded T site is negatively charged and H^+ (proton) exists at the grain boundary due to the smaller size of H^+(proton).

To increase the current, strong alkaline H_2O is used, which current career is OH^-,which is attracted by positive metal surface, to be H^+ and O_2 , and H^+ diffuses into the metal.

Because the surface metal voltage is higher than internal potential affected by the counter-electrode, thus, proton can diffuse along with the surface region with higher positive potential, and under positive metal voltage, H^+ can segregate at narrow grain boundary space. Thus, H loading and femto-H_2 generation occur simultaneously.

E. Transmutation Experiment with Femto-D_2[6]

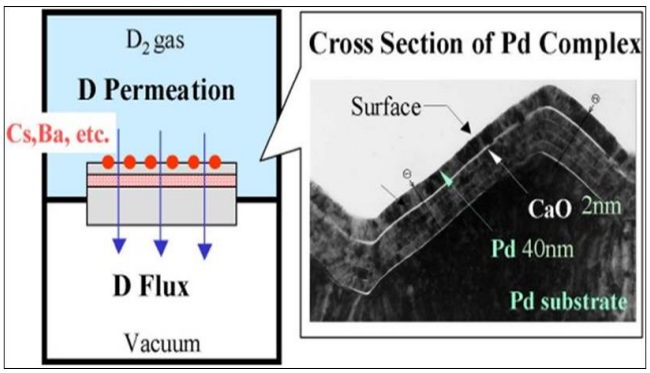

Fig 6 Transmutation Experiment with Femto-D_2 by Iwamura

Transmutation experiment used femto-D_2 with D_2 gas loading into Pd. This is innovative experiment of transmutation based on Cold Fusion.

This experiment's result shows that increase of atomic number is 4 by one femto-D_2 fusion with the target nucleus, thus, d=2, which means that d is constituted by two protons and one internal electron, which is contradictory to the current nucleus model.

F. Correct nucleus model and neutron model proved by transmutation experiment [7]

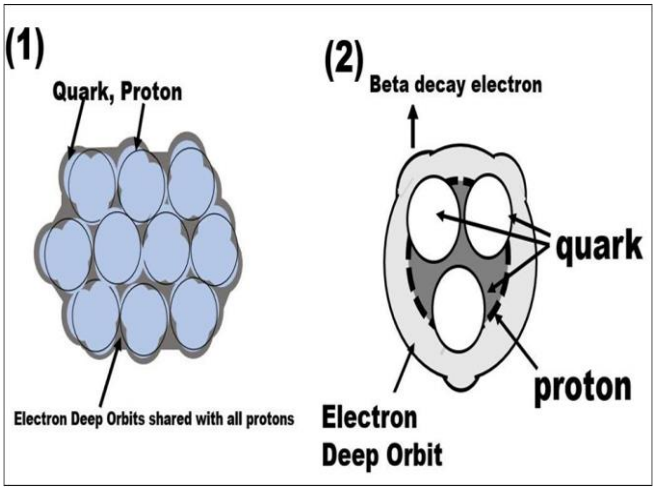

Fig 7 Correct Nucleus Model and Neutron Model

As d is believed to a pair of proton and neutron based on current nucleus model, however, d is proved to be constituted by two protons and one internal electron by transmutation experiment. As is shown in Fig.2(1), nucleus is constituted only by protons and internal electrons, and no neutron exists; neutron is a pair of proton and electron in deep orbit as is shown in Fin.2(2). This is the previous nucleus model before introduction of neutron as a fundamental particle.

In order to prove author's Cold Fusion mechanism based on femto-D_2, transmutation experiment with femto-H_2 is straightforward without any doubt that proton is proton.

G. Transmutation with Femto-H_2 Proves the Current Nucleus Model Incorrect.[8],[9]

I summaries my papers on the femto-H_2 transmutation in the various filed. Plasma fusion reactor has helium-3 in the baseline [8], which cause can be understood by femto-H2 and hydrogen embrittlement. which shows the creation of helium-3, and propose Conceptualized transmutation reactor based on the correct nucleus model. Femto-H_2 transmutation has the limitation because the addition of proton is only 2, thus it is impossible to transmute U and Pu to the stable element. Only the possible way to transmute U and Pu to safer element is adding femto-Cl_2, which need the correct understanding Cold fusion mechanism and correct nuclear physics, island of stability, which needs to be studied based on the correct nucleus model.

Because the impact of incorrect nuclear physics and incorrect particle physics is enormous, I think the only option is for the governments to take the initiative. If you are researchers on this filed and you understand the issue correctly, you should escalate this to your government.

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III. CONVENTIONAL BROWN GAS GENERATOR[2]

A. Brown Gas is Created by Femto-H_2 Transmutation of H_2O Nucleus[2]

Through logical thinking, I discovered that brown gas is generated by transmutation of H_2O nucleus (proton and oxygen nucleus) with femto-H_2, and it generates helium-3 and hydrogen, oxygen-16 by conventional electrolysis, oxygen-18 and helium-3 by transmutation with my femto-H2 transmutation mechanism; the reactions are as follows.

H in H_2O; $p+2p={}^{3}_{3}Li={}^{3}_{2}He$ (electron capture)

O in H_2O; ${}^{16}_{8}O+2p={}^{18}_{10}Ne=>{}^{18}_{9}F=>{}^{18}_{8}O$ (electron capture)

By correct mass analysis of brown gas that shows that brown gas has helium-3 will experimentally prove that femto-H_2 exists, and femto-D_2 exists. and it will prove that Cold Fusion mechanism based on femto-D_2 is correct, and will prove the current nucleus model incorrect.

Therefore, I requested the government and related company to analyze the composition of the brown gas. Again, I would like to ask the researchers on brown gas, nuclear physics or particle physics, and the company to sell brown gas to run mass analysis of the gas correctly with the mass resolution to obtain helium-3, which has the interfering cluster ions.

B. Conceptual Brown Gas Generator

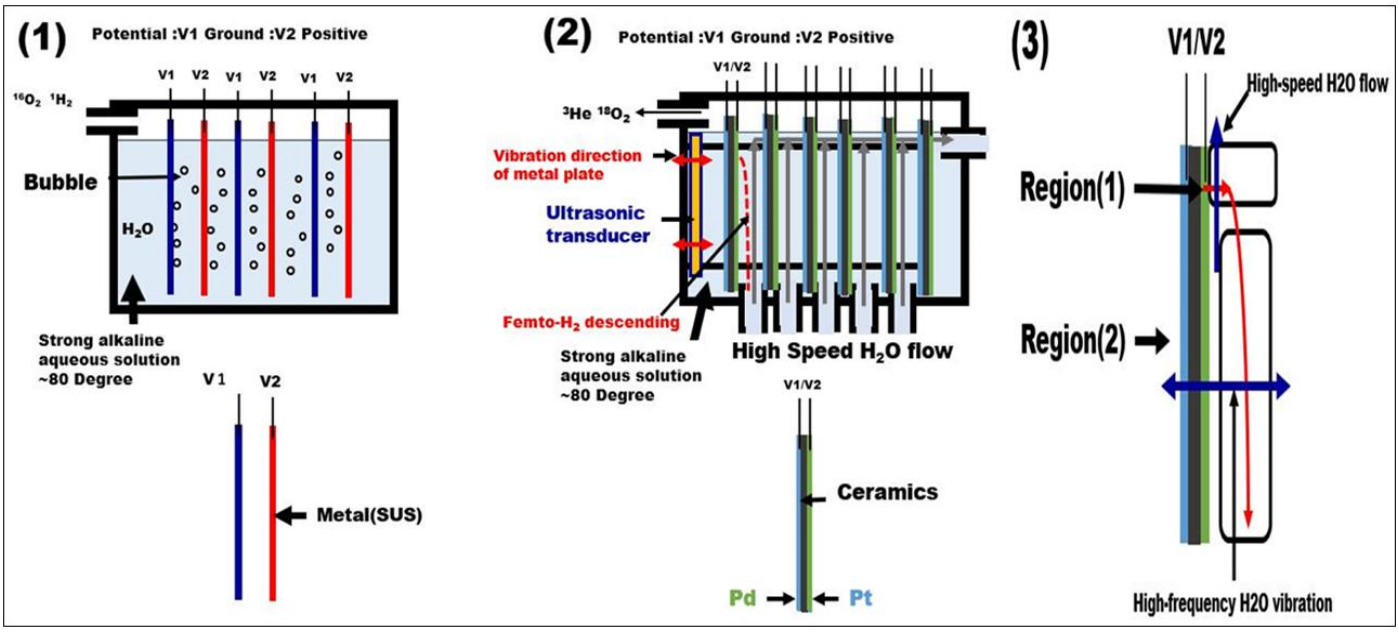

Fig 8 Brown Gas Generator (1) Conventional (2) Improved (3) Mechanism of Improvement

This is an electrolyzer that applies positive and negative voltages to every other metal substrate in a strong alkaline aqueous solution, and the substrates are SUS substrates with corrosion-resistant surfaces. I will show the cause why this conventional reactor can generate brown gas. I will show the improved brown gas generator based on femto-H_2 transmutation. Because femto-H_2 has no interaction with the surrounded metal atom due to the size difference between size of nucleus(fm) and size of atom(pA), thus the nucleus size is by 3 digit smaller than nucleus distance, it never collides with nucleus. Thus, femto-H_2 stay at the grain boundary of Pd, where femto-H_2 generates and it does not go out from the grain boundary if the metal surface is not facing downwards. But vertical metal plate to be vibrated laterally can push femto-H_2 out of grain boundary by Inertial force. Initially the speed of femto-H_2 is slow and move laterally, thus generator need to has H_2O flow from bottom to top shown in Fig.3(3). Reg (1) H_2O flow is perpendicular to the femto-H_2 moving direction to increase the collision probability.

And femto-H_2 descends by the gravity and its speed increases drastically to decrease the collision probability due to the faster speed. Thus, generator has the mechanism to vibrate metal plate laterally, and its move H_2O laterally according to the femto-H_2 descending trajectory and it increase the collision probability in Reg (2).

However, this may have issue due to the faster speed of femto-H_2 but the reaction time is very long and at maximum it is the plate size.

And conceptualized brown gas generator has the metal electrode on ceramics plate to reduce the volume of metal and Pd to confine hydrogen rapidly inside Pd.

In summary if the conventional brown gas generator has the uncontrolled vibration and uncontrolled H_2O flow, it can generate brown gas.

C. Conceptual Brown Gas Generator with Hydrogen Turbine.

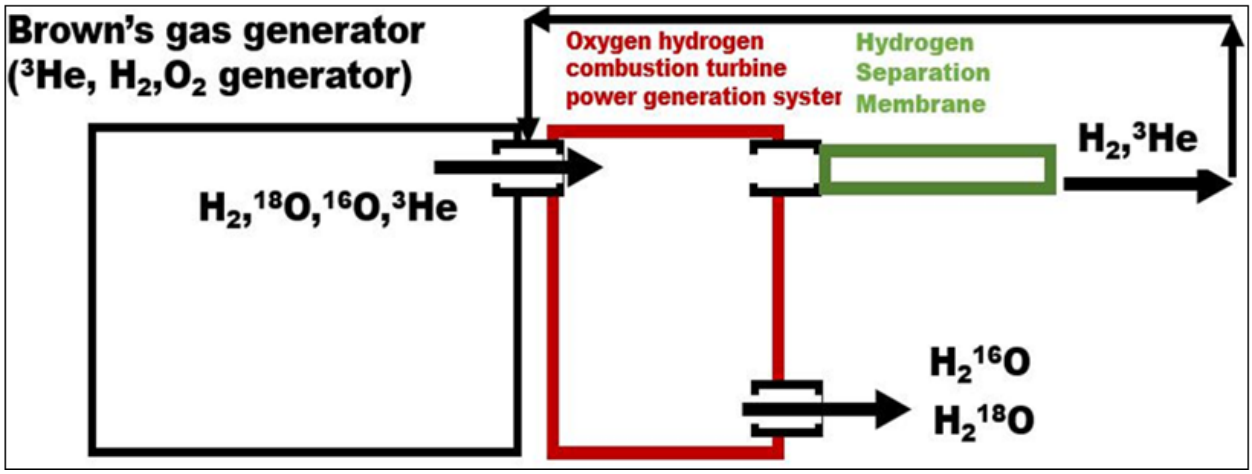

Fig 9 Power Generator of Brown Gas Combined with Hydrogen Gas Turbine.

Burning brown gas can generate power larger than input power, and it can be used for Hydrogen car powered by water. In such it is possible to collect helium-s and ozygen-18 by burning brown gas, Combustion efficiency can be further increased by mixing helium 3 with brown gas.

IV. OHMASA-GAS GENERATOR [PATENT PUBLICATION P6310172], [10]

A. OHMASA Gas Generator for Transmutation

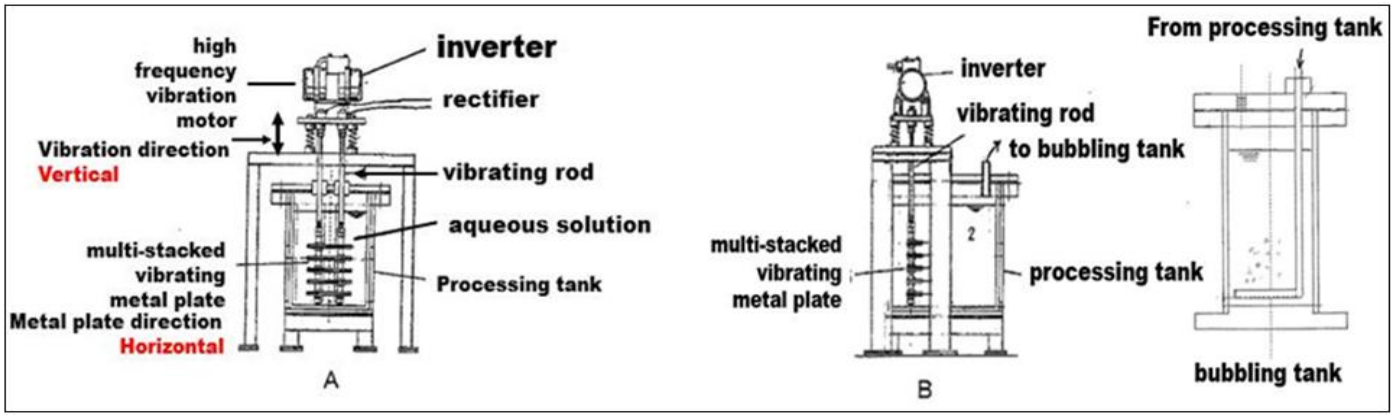

Fig 10 Transmutation with OHMASA-Gas Generator

Fig.10 shows the OHMASA gas generator developed by Ohmasa.

A processing tank, a high-frequency vibration motor fixed to a stand above the processing tank, two vibration rods connected to the stand and extending downwards of the processing tank, and attached to the lower part of the vibration rods. The high-frequency vibration motor is controlled by an inverter, and the high-frequency vibration motor is controlled by an inverter to drive the processing tank.

A DC power supply is connected to the left and right vibrating rods a rectifier, and reactor has a DC voltage application circuit, which is an electrolysis circuit, can be formed in which the plurality of vibrating metal plates is alternately connected to an anode and a cathode.

In the strong alkaline aqueous solution, containing the element to be transmuted, the multi-stacked plates are vibrated at a frequency of 100 to 170 Hz to transmute the element in the aqueous solution into another element. The heavy water is added to the solution to increases the transmutation efficiency. By adding tritium water instead of heavy water, elemental transmutation rate can be improved in a shorter time, and at the same time, the tritium water can be used effectively and its radioactivity can be reduced.

Author thinks that without voltage to Rods, it acts as a high frequency stirrer, and this can transmute because if the rod to be grounded, high frequency vibration of metal plates in strong alkaline aqueous solution, it can generate current between the metal plates which load hydrogen into metal with positive voltage.

The bubbling tank prevents radioactive cesium mixing with OHMASA gas by absorbing Cs with 3% KOH in the bubbling tank.

Note that without electrolysis condition tool is high frequency stirrer, and with electrolysis condition, tool is brown gas generator or OHMASA gas generator, in other words, it is a transmutation reactor with femto-H_2.

B. OHMASA Gas

OHMASA-gas (Oxygen Hydrogen Mixed Atomic Symmetrized Aeration Gas) is explained in ref [10].

One option for the non-hydrocarbon fuels is to use so-called brown gas obtained by electrolysis of water. Although it must be stored under high compression for the actual use of brown gas, it cannot be stored under high compression due to the regulation for the safety that prohibits compressing a gaseous mixture of hydrogen and oxygen of 2% or more to a pressure of 1 MPa or more.

Embodiments include those made of hydrogen-oxygen gas obtained by electrolysis of water using vibration stirring (vibratory fluid stirring). This hydrogen-oxygen gas is an invention by Ohmasa, and is known as OHMASA-GAS. It is believed that OHMASA-GAS is different from ordinary brown gas, and is an oxygen-hydrogen coexisting gas in which hydrogen and oxygen coexist in unique bonding forms, and it is difficult to explode even under high compression and is safe.

OHMASA insists that the powerful energy generated by the bursting of the nano-bubbles can greatly improves the transmutation. This transmutation technology can also transmute calcium into valuable cobalt and nickel.

As I explained the mechanism of brown gas generation, it must be the transmutation of H_2O with vibration perpendicular to the femto-H2 descending trajectory, and brown gas must be a mixture of hydrogen, oxygen-16 oxygen-18 and helium-3. However, transmutation with femto-H_2 is a new mechanism invented lately, thus since now they have not understood the importance to monitor the helium-3 concentration in the generated gas. Thus, it is by far important to prove that OHMASA gas is not the conventional brown gas by the comparison of mass spectrometry. Author thinks that OHMASA-gas has by far higher concentration of helium-3 than conventional brown gas because OMASA gas because OHMASA gas is generated by the vibrating electrolyzer in strong alkaline.

Although its vibration direction is not based on femto-H_2 transmutation mechanism, its vibration can improve the transmutation reaction by the turbulence of H2O flow.

Brown gas is generated by conventional electrolyzer, and I guess that some of brown gas generators may have uncontrolled vibration and/or H_2O flow between metal plates which cause transmutation with femto-H_2, and the vertical metal plate may have advantage to have the longer reaction distance, because Fig.4 shows the lateral metal plate which reaction length is the distance between the metal plates, which is set to be minimum.

Most company who delivered OHMASA gas in Japan believes that OHMASA gas has the unique molecular different from H2O because mass spectra showed the peak at 18, 36, etc., and they think that H_2O (mass-18) is special form of unique molecules composed of two hydrogens and one oxygen. Actually, it must be oxygen-18, which is generated by the fusion between oxygen-16 and femto-H2(2 protons) and by electron capture.

I think it is important to understand what is happening when OHMASA gas compressed at high pressure. Because mixture of hydrogen oxygen helium-4 gas has been studied by the researcher due to its importance to use hydrogen oxygen combustion for the coming hydrogen society.

I would like you to escalate this to the governments due to its importance.

I think it is safer to use brown gas generator equipped with hydrogen gas turbine.

For transmutation, micro-bubble hinders the transmutation based on the mechanism of femto-H_2 transmutation, therefore I propose the brown gas generator based on the mechanism of femto-H_2 transmutation in ref [2].

V. MECHANISM OF OHMASA GAS GENERATOR

A. Mechanism Bubble Generation of Ohmasa Gas Generator

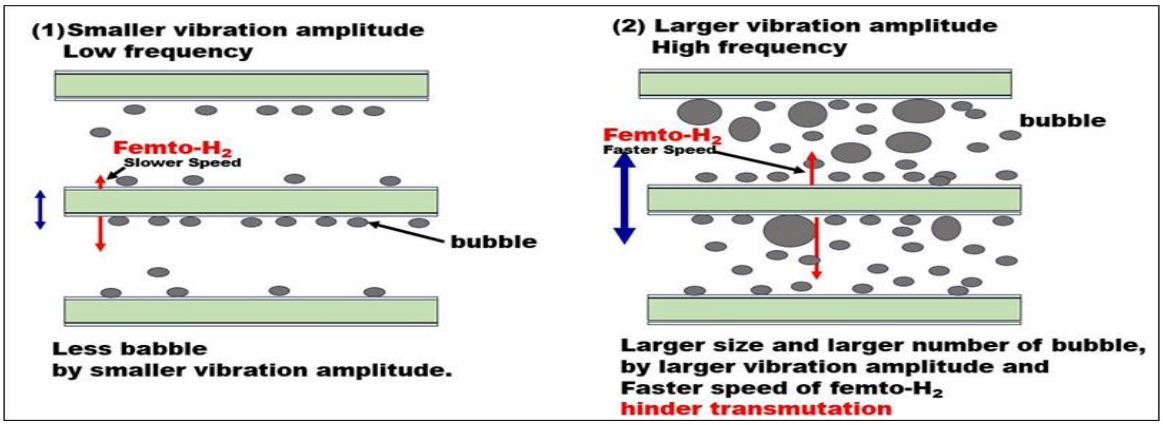

Fig 11 Mechanism for Bubbles to Hinder Transmutation.

I think that his original purpose of to use vibrator is to stir H_2O to improve the electrolysis of H_2O, however no comment of the frequency and amplitude of vibration, it is not clear the mechanism of bubble generation and transmutation.

As is shown in Fig.11, higher frequency or larger amplitude of vibration can increase the number and size of bubble, and of course the larger number and larger size of bubble causes lower speed of transmutation of H_2O, and higher speed of vibration makes Femto-H_2 faster to make transmutation speed slower.

Actually, as is explained in Embodiment-3(p2015-55527A), transmutation rate is maximum at 160 Hz.

B. Mechanism of the Improved Transmutation Rate of Ohmasa Gas Generator

Ohmasa insists that the water to be treated to electrolysis treatment while causing the water to be treated to undergo vibrational flow agitation, ad he insists that bursting energy of nano-bubble created by high frequency stirrer with under electrolysis condition can create nano bubble, and when it burst, the released energy is so large that it can transmute elements and tritium. However, I do not agree, and I presume that my mechanism of femto-H2 transmutation mechanism is correct. deeply interpreted, I found that OHMASA gas generator follows my femto-H_2 transmutation mechanism in many ways.

C. Mechanism on Metal Plate Vibration to Lateral H2O Motion Increae the Transmutation Rate.

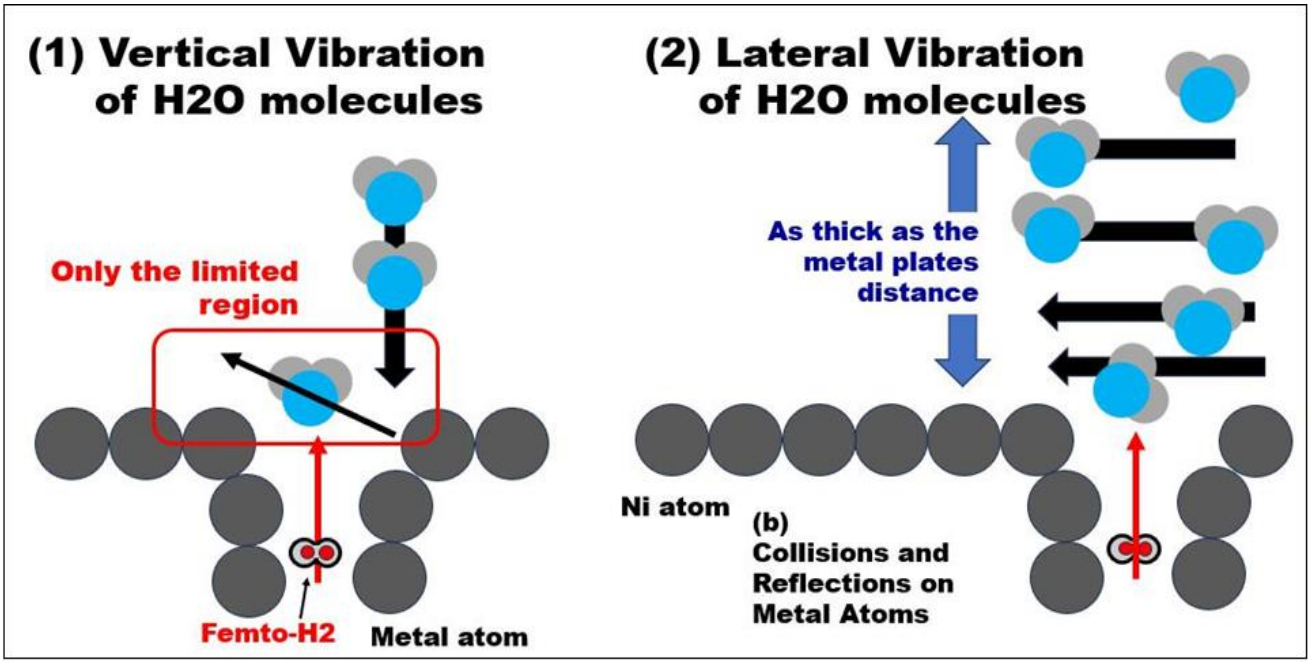

Fig 12 Mechanism of Metal Plate Vibration to Improve Transmutation Efficiency

Vertical vibration of metal plate causes turbulent H_2O flow, and on the metal surface H2O is reflected, as is shown in Fig.12(1) by the metal surface and the motion is changed on the surface, and it may have the lateral motion, however region of lateral motion very much limited in surface-near region. In case of lateral vibration along with between the metal plates, the region is as wide as the distance of metal-plate. Due the very narrow gap between the plate, it is not easy to vibrate the H_2O there.

However, author thinks that it has a lot of room for improvement with my conceptualized brown gas generator in next section because currently OHMASA gas generator use the vertical vibration with very good transmutation efficiency.

D. Mechanism on Metal Plate Vibration to Emit Femto-H_2 from the Grain Boundary

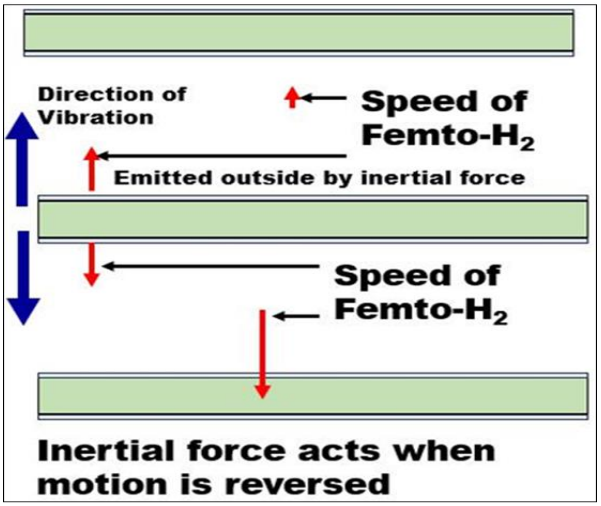

Fig 13 Mechanism of Metal Plate Vibration to Improve Transmutation Efficiency

Mechanism of femto-H_2 transmutation is as follows.

H_2O needs to move faster across the femto-H_2 motion, and femto-H_2 need to move slower to improve the transmutation rate.

When the vibration motion stop, inertial force emits femto-H_2 from the metal grain boundary on the metal plate upside, and femto-H_2 is decelerated by gravity. Oppositely, femto-H_2 in the metal on the bottom side descend without vibration and by vibration speed of femto-H_2 becomes faster and gravity accelerates the descending speed. Therefore, transmutation on the upside is by far faster than bottom side. This can be affected by the speed of metal plate motion.

However, regarding the H_2O flow, it is vertical or turbulent.

Since the H_2O that moves parallel to the metal plate due to reflection near the metal surface can improve the transmutation rate.

VI. CONCEPTIUALIZED BROWN GAS GENERATOR BASED ON FEMTO-H_2 TRANSMUTATION MECHANISM

A. Conceptualized Brown Gas Genarator with H_2O Flow

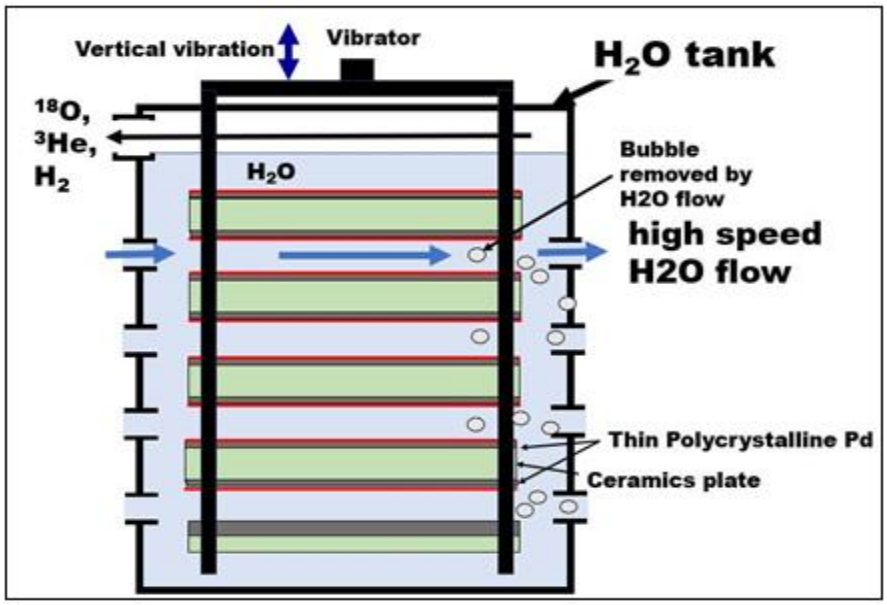

Fig 14 Conceptualized Brown Gas Generator with H_2O Flow

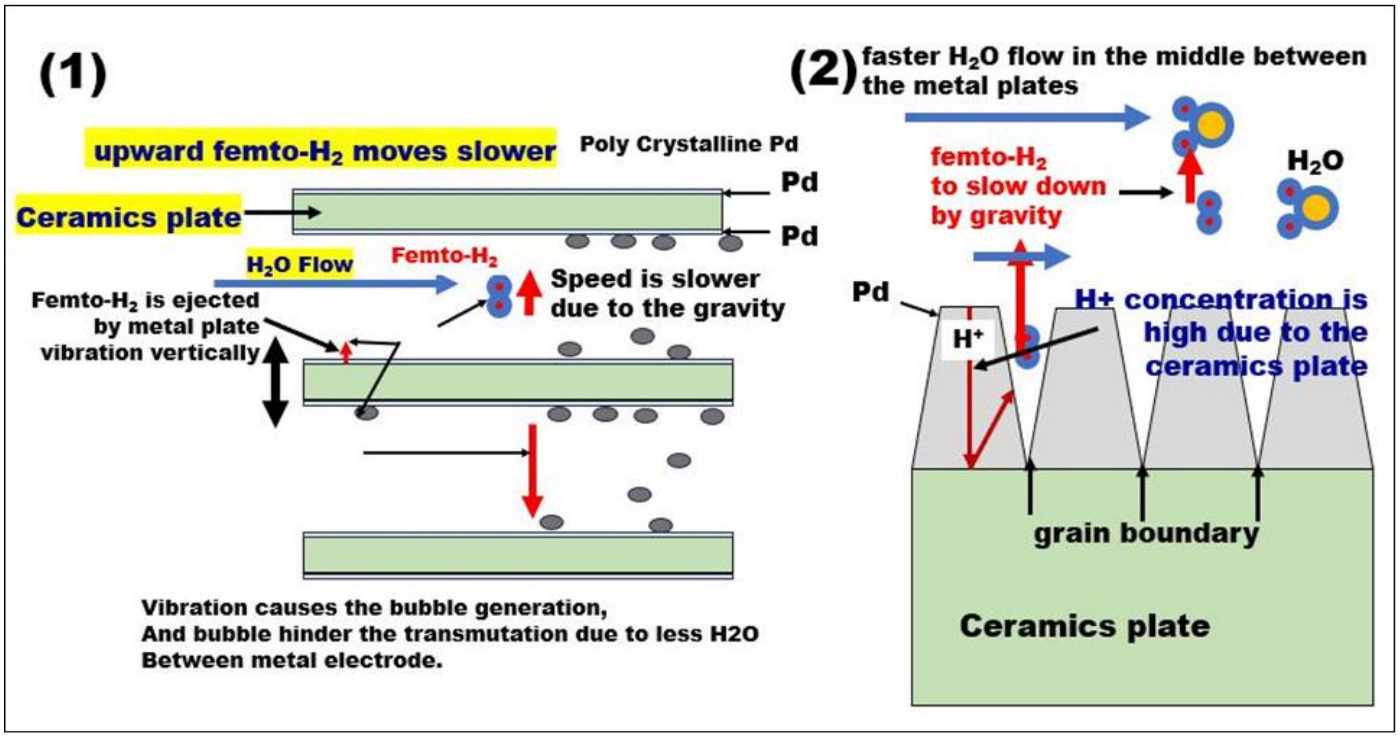

Fig 15 Mechanism of H_2O Flow and Slower Femto-H_2 Speed to Improve Transmutation Rate.

To improve Ohmasa gas generator, I will propose the conceptualized brown generator based on

OHMASA gas generator. The conceptualized brown gas generator has high-speed H_2O flow between the metal electrodes and in the middle between the metal electrode, the speed is faster.

Femto-H_2 is emitted by the inertial force when vibration is reversed, and it is slowed down by the gravity.

H_2O flow can replace the low-concentration contaminated water with the higher concentration of the tritium contaminated water, and it can also remove the bubbles.

B. Conceptualized Brown Gas Genarator with H_2O Vibration

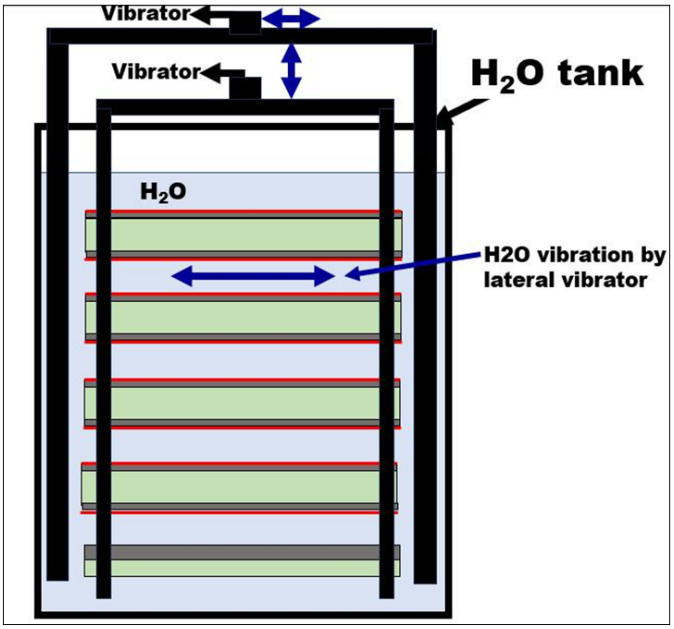

Fig 16 Conceptual Brown Gas Generator with Vibration Laterally to Vibrate H_2O between Metals and Vibration of Metal Electrode Vertically.

It is effective to vibrate H_2O directly by vibrating plates in H_2O tank. Vibration and H_2O flow can be attached separately on the two side of the square plate which has 4 side.

Because H_2O flow is also important because the H_2O flow has the different effect from H_2O vibration as explained above.

Since the square electrode has four sides, both mechanism of H_2O flow and H_2O vibration can be implemented separately to the two opposing electrodes, in the intersecting direction.

VII. P2015-55527A[PUBLISHED PATENT GAZETTE][11]

A. Embodiment-1(p2015-55527A)

Table 1 Cs Radiation Dose Reduction by High Frequency Stirrer

P2015-55527A Embodiment-1	Concentration before	Concentration after	Reduction %
Collection date	2012.08.01	2012.08.23	After 22 days
^{137}Cs	336Bq	261Bq	~22%
^{134}Cs	207Bq	163Bq	~21%

➢ *Experimental Condition*

- Radioactive cesium contaminated water
- The high frequency stirrer vibrated at 160 Hz for 22days.

B. Embodiment-2(p2015-55527A)

Table 2 Cs Radiation Dose Reduction by Brown Gas Generator

P2015-55527A Embodiment-2-1	Concentration before	intermediate results	Final result	Reduction %	Reduction %
Collection date	2012.10.17	2012.10.30	2012.11.16	After 13 days	After 30 days
^{137}Cs	1955Bq	1042Bq	520Bq	50%	75%
^{134}Cs	1162Bq	606Bq	308Bq	50%	75%
$_{56}Ba$	0.52mg/L	3.0mg/L			

- Radioactive cesium contaminated water
- Brown gas generator vibrates at vibrated at 160 Hz.
- (The high frequency stirrer(embodiment-1) with electrolysis condition)

Table 3 Radiation Dose in the Bubbling Tank

P2015-55527A Embodiment-2-2	Concentration before	intermediate results	Final result
Collection date	2012.10.17	2012.10.30	2012.11.16
^{137}Cs	--------	21Bq	23Bq
^{134}Cs	--------	10Bq	12Bq
$_{56}Ba$	--------	<10μg/L	<10μg/L

The transmutation rate was significantly improved from 75% to 22% by high frequency stirrer with electrolysis condition, which is brown gas generator.

Ohmasa insists that this can be caused by the effect of the powerful bursting energy of nano-microbubbles generated during electrolysis.

The cesium-137 in the bubbling tank is 21-23Bq, and the cesium-134 is 10-12Bq, both of which have a concentration of about 1/1000 of the original contaminated water, and are accompanied by oxyhydrogen gas (OHMASA-GAS) produced by electrolysis. The amount of radioactive element in OHMASA gas is very small.

Author thinks that the high frequency stirrer with electrolysis condition is brown gas generator, and improvement is by the vibration of metal plate to improve the collision rate between femto-H_2 and Cs nucleus, not by bursting energy of nano-micro bubble.

C. Embodiment-3(p2015-55527A)

Table 4 Radiation Dose Reduction VS Vibration Frequency of High Frequency Stirrer

P2015-55527A Embodiment-3	time	Transmutation Rate				
Vibration frequency(Hz)		120	140	160	180	190
^{137}Cs	13days	20%	30%	50%	32%	20%
	30days	30%	50%	75%	53%	31%
^{134}Cs	13days	20%	50%	50%	33%	21%
	30days	30%	50%	75%	52%	32%

- Radioactive cesium contaminated water.
- High frequency stirrer vibrated at from 120 to 190 Hz.

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A large difference in the transmutation rate was observed depending on the frequency, and the rate in the case of 160 Hz (Embodiment-2) was the highest.

D. Embodiment-4(p2015-55527A)

Table 5 Radiation Dose Reduction by Brown Gas Generator at 40 °C.

P2015-55527A Embodiment-4-1	Concentration before	Experiment start date	Final result	Reduction %
Collection date	2012.10.17	2012.11.20	2012.12.18	After 30 days
^{137}Cs	~1920Bq	---------	~538Bq	~72%
^{134}Cs	~1162Bq	---------	~313Bq	~73%

Table 6 Radiation Dose Reduction by Brown Gas Generator at 80 °C.

P2015-55527A Embodiment-4-2	Concentration before	Experiment start date	Final result	Reduction %
Collection date	2012.10.17	2012.11.20	2012.12.18	After 30 days
^{137}Cs	1920Bq	---------	538Bq	72%
^{134}Cs	1162Bq	---------	313Bq	73%

- Radioactive cesium contaminated water
- Brown gas generator vibrates at 160 Hz.
- Temperature of H2O is 40 °C (upper) and 80 °C(lower).

Results show no temperature difference. Typical electrolysis condition is 80 °C to prevent vapor of H2O and increase the OH- concentration in order to improve efficiency of electrolysis.

VIII. P2022-23989A[PUBLISHED PATENT GAZETTE][12]

A. Embodiment-1(p2022-239989A)

Table 7 Transmutation of Ca

P2022-23989A-embodiment-1(mg/L)	$_{20}Ca$	$_{22}Ti$	$_{26}Fe$	$_{27}Co$	$_{28}Ni$	$_{29}Cu$
Concentration before	1400	<0.001	0.116	0.001	0.013	0.012
Concentration after	1050	12	0.5	7	9	11
Concentration after *1	890	23	2	14	26	31

➢ *Experimental Condition*

- A 0.5% aqueous solution of CaCl2.
- Added A 0.5% D2O(5g/L).
- The high frequency stirrer vibrated at 170 Hz for 3 hours.
- Comparison between metal plate and Palladium plated metal plate (*1).

B. Embodiment-4(p2022-239989A)

Table 8 Transmutation of Cs with 1% CaCl2

P2022-23989A-embodiment-4 (mg/L)	$_{26}$Fe	$_{28}$Ni	$_{30}$Zn	$_{55}$Cs	$_{56}$Ba	$_{74}$W	$_{78}$Pt	$_{79}$Au
Concentration before	0.021	<0.001	0.018	6700	0.021	<0.001	<0.001	<0.001
Concentration after *2	18	5	16	4800	48	22	24	18
Concentration after *3	33	22	25	3880	58	40	51	42

➢ *Experimental Condition*

- A 1% aqueous solution of CsCl2.
- *2 Added 0.5μsv tritium water (5g/L)
- *3 The high frequency stirrer vibrated at 170 Hz for 3 hours.

After transmutation of 3 hours, radiation dose decreased from 0.5μsv to less than 0.05μsv.

Adding tritium water increases the concentrations of all elements.

C. Embodiment-5(p2022-239989A)

Table 9 Radiation Dose Reduction

P2022-23989A-embodiment-5 Process time[Hr]	before	5	10	15	20	25
Radiation dose [μsv]	0.8	0.5	0.35	0.12	0.084	0.051

During the treatment of tritiated water, the processing tank was filled with a "gas" thought to be "helium", and the entire liquid was cloudy with "bubbles".

However, when the vibratory stirring was stopped, the gas that had made the entire liquid cloudy rose to the surface, and the liquid became ``transparent" after a few minutes. Immediately after restarting the stirring vibration, the mixture became cloudy due to the gas body.

IX. TRANSMUTATION MECHANISM

A. The Trasmutation Path

Femto-H_2 is neutral and it can fuse with the target nucleus in strong alkaline H_2O, and metal atoms are isolated in H2O, thus femto-H_2 can fuse with metal nucleus to transmute it.

By adding 2 protons metal nucleus increase its mass by 2, and increase charge, or atomic number by 2, and the nucleus has excess proton in the nucleus and it capture electron to stabilize the nucleus.

According to this rule, we can find which route to take from the isotope of the original element in the table of element isotopes and atomic numbers. The stability of the isotope is an issue, and which route to choose is determined by the relationship between the half-life and the transmutation rate per element

The following section use the flowing notations.

[] is half-life and () is unstable isotope.

=> is electron capture.

+2 p is fusion with femto-H2.

B. ^{55}Cs to ^{55}Ba Proved in Transmutation Mechanism Proved by Embodiment-2(p2015-55527A)

Table 10 Transmutation route from 55Cs to 58Ce.

$_{55}$Cs				$_{56}$Ba				$_{57}$La				$_{58}$Ce			
ISOT OPE	NA	Half-Life	DP	ISOT OPE	NA	Half-Life	DP	ISOT OPE	NA	Half-Life	DP	ISOT OPE	NA	Half-Life	DP
130Cs															
131Cs				130Ba	0.11%	(0.5-2.7)x10^{21} y	130Xe								
132Cs															
133Cs	100 %	Stable		132Ba	0.10%	>3x10^{20} y	132Xe					134Ce	syn	3.16 d	134La
134Cs	syn	2.0648 y	134Xe	133Ba	syn	10.51 y	133Cs					135Ce		17.7(3) h	?
			134Ba	134Ba	2.42%	Stable						136Ce	0.19%	> 3.8x10^{16} y	136Ba
135Cs	trace	2.3x10^{6} y	135Ba	135Ba	6.59%	Stable		137La	syn	60,000 y	137Ba	137Ce		9.0(3) h	137Ba
				136Ba	7.85%	Stable		138La	0.09%	1.05x10^{11} y	138Ba ,130Ce	138Ce	0.25%	> 1.5x10^{14} y	138Ba
137Cs	trace	30.17 y[2]	137Ba	137Ba	11.23 %	Stable		139La	99.91 %	Stable		139Ce	syn	137.640 d	139La
				138Ba	71.70 %	Stable						140Ce	88.45 %	Stable	
												141Ce	syn	32.501 d	141Pr
												142Ce	11.11 %	> 5x10^{16} y	142Nd
												144Ce	syn	284.893 d	144Pr

141Pr

Author thinks that adding CsCl2 is to monitor the transmutation path of Radioactive Cs due to the smaller amount of $^{133}_{55}$Cs and radioactive Cs in the Cs contaminated water.

I discovered the rout from $^{133}_{55}$Cs(reagent), which is for the trace of transmutation of Cs as follows.

$^{133}_{55}$Cs+2p=($^{135}_{57}$La) =>$^{135}_{56}$Ba ; $^{135}_{56}$Ba+2p=($^{137}_{58}$Ce) =>$^{137}_{57}$La ; $^{137}_{57}$La+2p=($^{139}_{59}$Pr)=$^{139}_{58}$La

$^{135}_{55}$Cs+2p=$^{137}_{57}$La ; $^{137}_{57}$La+2p=($^{139}_{59}$Pr) =>$^{139}_{58}$Ce

Nota the half-life of $^{137}_{58}$Ce is longer than process time of 7min.

$^{137}_{55}$Cs+2p=$^{139}_{57}$La; $^{139}_{57}$La+2p=$^{141}_{59}$Pr

Embodiment-2(p2015-55527A) showed the lower radioactive dose, and higher Ba concentration, which is consistent with the route of transmutation above.^{135}Cs and ^{137}Cs were transmuted to the stabler element.

Ba concentration is high because ^{133}Ba is transmuted to ^{135}Ba and NA of ^{133}Cs is 100% stable element.

C. From $_{38}Sr$ to $_{40}Zr$

Table 11 Transmutation Route from 38Sr to 40Zr.

$_{38}Sr$				$_{39}Y$				$_{40}Zr$			
ISOTOPE	NA	Half-Life	DP	ISOTOPE	NA	Half-Life	DP	ISOTOPE	NA	Half-Life	DP
82Sr	syn	25.36 d	82Rb								
83Sr	syn	1.35 d	83Rb								
84Sr	0.56%	Stable									
85Sr	syn	64.84 d	85Rb								
86Sr	9.86%	Stable									
87Sr	7.00%	Stable		87Y	syn	3.35 d	87Sr				
88Sr	82.58%	Stable		88Y	syn	106.6 d	88Sr	90Zr	51.45%	Stable	
89Sr	syn	50.52 d	89Rb,89Y	89Y	100%	Stable		91Zr	11.22%	Stable	
90Sr	trace	28.90 y	90Y	90Y	syn	2.67 d	90Zr	92Zr	17.15%	Stable	
				91Y	syn	58.5 d	91Zr	93Zr	trace	$1.53x10^6$ y	93Nb
							-	94Zr	17.38%	> $1.1x10^{17}$ y	94Mo
				88Zr	syn	83.4 d	88Y	96Zr	2.80%	$2.0x10^{19}$ y	96Mo
							-				
				89Zr	syn	78.4 h	89Y				

Because the radioactively contaminated water from the Fukushima nuclear power plant contains strontium-90.

Tthey can be transmuted to $_{40}Zr$

$^{90}{}_{38}Sr+2p=^{92}{}_{40}Zr$

$^{89}{}_{38}Sr+2p=^{91}{}_{40}Zr$

$^{88}{}_{38}Sr+2p=^{90}{}_{40}Zr$

Thus, ^{90}Sr can be transmuted to ^{92}Zr and radioactive dose can be lowered.

D. Transmutation Speed of Tritium and Metal

In Embodiment-5(p2022-239989A) shows the transmutation speed of tritium, it takes 20 hours from 0.8 to 0.084.

In embodiment-4(p2022-239989A), after transmutation of 3 hours, radiation dose decreased from 0.5μsv to less than 0.05μsv.

Ohmasa thinks that that tritium transmutation can be used to generate precious metal, which I will report soon.

In this report, I focused on the transmutation mechanism and conceptualized brown gas generator to be further improved.

X. DISCUSSION

Large-scale brown gas generator is promising to transmute tritium, which was proved by experiments by Ohmasa, and currently the reactor is too.

With gaining profits to generate power to collecting helium-3. For now, helium is very important element used for industry and medicine. Especially helium-4 is being depleted from the earth, we should mass produce helium-3 by large scale brown gas generator in place of helium-4.

This need the social system for helium to be collected, and author thinks that first of all, we should start the discussion.

Helium-3 production and transmutation of tritium from nuclear power plant can be dose simultaneously, and in the future, brown gas generator will mass -produce precious metals simultaneously, to be reported.

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