

Review Article

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Wide Application of Pico-Extended Particle Water for Environment, Human Body, and Radioactivity

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ABSTRACT

Our research shows unique variety of water which function is not by H₂O molecule. What we notice is only hydrogen, but it's not hydrogen atom but not an ion. We regard hydrogen in the water the pico-extended particle (1/1000 of nano meter). Namely, the electron oscillates in the particle accessing proton and away from it. We fabricate the particle by pressurizing tap water. As results, we found the interesting evidences. First, we indicate the broken beaker test of the frozen water, no dripping from the defrosted meats in the activated bag by the water, and the permeability of skin lotion in the activated bottle was significant than the usual bottle, which phenomena are because of the smallness of the water. Furthermore, we discuss an activated bracelet and foods to relieve the internal radiation contamination in Fukushima. We reported radiation reduction of radioactive cesium in the contaminated soils and withered grasses changed to stable barium, lanthanum, and cerium after reaction of radioactive cesium with the water.

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Introduction

Water is so familiar worldwide, at the same time drought has been widespread. Many types of research regarding water have been reported in macroscopical viewpoints, which is a crucial issue regardless. Furthermore, the researcher of water focuses on the H₂O molecule or its clusters [1-4]. There is a different point like the fourth phase of water [5]. Exciting research on hydrogen bonds has discussed hydrogen-bond kinetics in liquid water, noticing the dynamic mechanics between other water molecule [6]. However, they treated hydrogen-bond water to react with another molecule and another interesting report was ultrafast memory loss in the hydrogen bond network of liquid H₂O. This report associated with energy of the infrared spectrum of the OH stretching vibration which was higher energy than the pico-extended particle [7].

However, we pay attention to the hydrogen in H₂O. Meanwhile, we developed the activated water named MICA water (Minimal Catalysis) which was fabricated at 30 MPa usually [8]. First, we studied how to reduce air pollution like CO₂ and NO_x from exhausted gases from an automobile using two cars which were a usual and activated car [9].

Then, we fabricate the water pressurizing (more than 100MPa) to tap water, and I named SIGN water (Spin Information Gauge Network). We assume the activated water contains pico-extended particle, which we call infoton, depicting $\langle H^+ \sim e^- \rangle$ [10]. The

infoton is neither an atom nor an ion, and electron oscillates in the particle. We depict the particle image of two characteristics and how to recognize the particle with each instrument shown in Figure: 1.

We found two significant items in the water. One is the effect of the size of water, and another is the nuclear transmutation. We may consider the pico-extended particle water transfers certain information and changes the substance's property. The information transfer is an essential characteristic of the activated water, which relate to the bracelets on an arm, beaker, and the bottle of lotion skin for the human body.

Here we discuss the smallness of the water leading to broken beakers, dripping meat juice after defrost, and wettability of water relating to permeability.

Furthermore, we discuss nuclear transmutation, showing radiation reduction and its mechanism of cesium to stable barium, etc. We repeated the experiments with the activated water in the Fukushima soils and withered grasses.

We have known many claims for cold fusion for an extended period since the Fleischmann accident. Pons published the nuclear fusion of deuterium in 1989, an unlikely explanation for the excess heat. As far as a nucleus is concerned, we must discuss other nuclear parameters, such as spin, magnetic moment, and radiation, although we do not discuss here [11].

Nuclear transformation was popular in late 1990s through early 2000s. Cesium (Cs) and praseodymium (Pr) were detected after treatment with H₂O or D₂O on a Pd film [12].

In other research, tritium generation and significant excess heat evolution by electrolysis have been reported [13]. Although another study does not directly relate to cold fusion, Cs was added on the surface of a palladium (Pd) complex, Pr emerged on the surface. At the same time, Cs decreased after the Pd complex providing D₂ gas at 343 K and 1 atm for about one week [14].

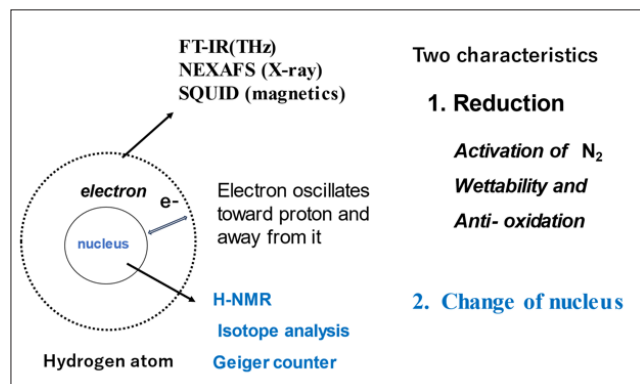


Figure 1: The pico - extended particle image; two characteristics and instruments

FT-IR; Fourier Transform Infrared Spectroscopy, NEXAFS; Near-edge X-ray absorption fine structure, SQUID; Superconducting Quantum Interference Device. H-NMR; hydrogen-Nuclear Magnetic Resonance.

Methods and Experiments

We provide hydrogen-dissociated water without any additive involving the pico-extended particle, namely infoton, <H⁺~e⁻>, and transfers to other substances as information like momentum. The infoton may activate air, but we assume nitrogen rather than oxygen because of the 2p electron of outermost [15]; we calculated electronic structure and energy gap of nitrogen gas with the molecular orbital method and found transferring energy through N₂ gas to plastics, ceramics, glass, metal, and other water [16].

Furthermore, seeing water molecule, even in an electron microscope, is impossible. So, we can indirectly evaluate water's smallness when comparing tap and deionized water spectra using hydrogen-nuclear magnetic resonance (H-NMR). We use the electric furnace to see the melting status of a metal up to 1000° And we use GM counter ("Inspector" made in U.S.A.) for β-ray, and "G. Scout" (made in Germany) for γ-ray and β-ray measurements. The element analysis is the induction coupled plasma-mass spectrometry (ICP-MS) method.

Results and Discussion

The theme below may be due to the size of the MICA and SIGN water. An aquaporin protein in a body is well known, which absorbs only water through less than 2 angstroms (~10⁻⁹m φ) [17,18]. Regarding the pico-extended particle water (~10⁻¹² mφ) can quickly go through the narrow part. This absorbing ability is one of the big points of the water. When we talk about hydrogen bonds, there is not enough energy to dissociate the bonds, which is calculated at only 0.8 MPa [16].

There are some researches about hydrogen bonds, like potential energy of water dimer [19], and the potential energy of H—H₂O [20]. Furthermore, this is also the hydrogen bond network in liquid water dimer [21] and energetic discussion of hydrogen bond was reported in oxygen (1s) ionization [22].

There are no studies to dissociate hydrogen bond, and discuss what may happen.

Ice and Beaker

The pico-extended water contributes to keeping the volume of water. We report the frozen water in the beakers after 15 hrs. indicating Figure 1. The regular water beaker A increased about 10% volume and became clouded resulting in crack and broken. see crack on the beaker B (activated water) did not break and there were no damages showing white ice.

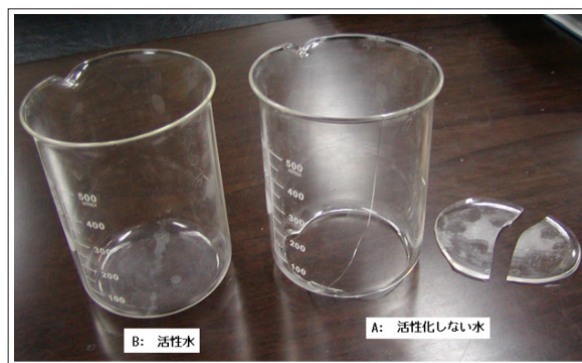


Figure 1: The beakers after freezing test; A (right); regular water, broken bottom glass, and B (left) in activated water.

We can estimate the two mechanisms of the beaker tests; one, the activated water in the B may become smaller size of the water cluster due to emit the terahertz electromagnetic wave (THz); Namely, the pico-extended particle water emits THz, because of the plasma frequency (ω_P) shown in the following equation.

$$\omega_p^2 \approx 4\pi n e^2 / m^* \epsilon_\infty = \sim 5 \text{ THz}$$

ω_P; plasma frequency, n; molecular number=1, e; electron charge

ε_∞ relative permittivity (0.4). We found the unique research resonant intermolecular transfer of vibrational energy of water, but they discussed OH stretch vibration [18]. The O-H energy is around near infrared which is higher than infoton energy (far-infrared through THz) [16]. The other reports relate the energy of hydrogen bond network which is macroscopic view shown previously.

Another reason is due to the smallness of the pico-extended particle. The particle may penetrate the meat cell, and protect the liquid from the cell, and then no dripping can be achieved when defrosting. The reason is the mixture of oil and water, which are usually not mixed, such as colloidal dispersion.

Dripping from Chicken when Defrosting

The chicken meats were wrapped in the polyethylene film; one was usual and another was the activated film. We reported the tests of pork and beef meats [23].

We discussed nitrogen gas energized in the N-N bonding based on the computer simulation of molecular orbital method [24].

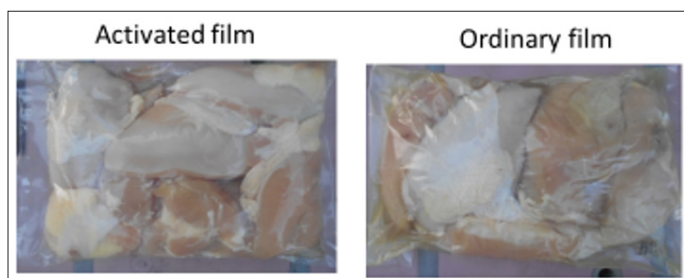


Figure 2: Dripping from chickens. There are no drippings or smells in the activated film while spoiling and color changes in an ordinary film besides dripping----- test conditions; for 8 days at 8 °C

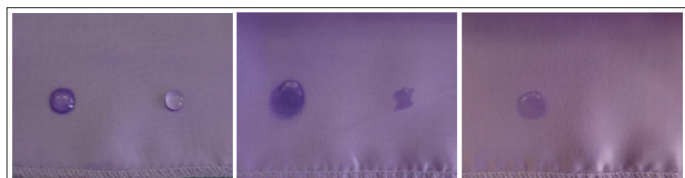
Permeating Force of the Water in Skin Lotion

This is because of the smallness of the water like 1) and 2) above. We report the effects on the lotion which bottle (we call it MICA bottle) is activated, as shown in Figure. 3. A drop on the polyester cloth looks at permeation. Generally, polyester indicates lower absorption, so penetration is scare and difficult to permeate.



Figure 3: The volume is 50 ml. It is commercial one and is activated by MICA water

The results are shown in Figure 4 (1) which is just right after dropping. Figure 4 (2) and (3) indicate the 2nd sheet and the 7th sheet after ten minutes later from dropping, respectively.



(1) just after dropping (2) 2nd sheet after 10min. (3) 7th sheet after 10min.

Figure 4. (1); The drops on the cloth jus right after dropping; the left is MICA, and the right is control in each photo on the polyethylene cloth.

We can consider the significant permeability in the MICA droplet than the control one. We will discuss wettability relating to permeability later.

Figure 4 (2) and (3) show penetration ability after ten minutes later. We can see the droplets (2) and the status on the 2nd sheet. The MICA droplet shows clear, but the figure of droplet from the control is not. Furthermore, the control droplet disappeared on the 7th sheet (3), although the MICA droplet of the left in (3) is faintly visible.

We can assume the MICA droplet is supposed to be smaller than the control one, namely, pico-extended particle.

Now we discuss the Figure 5 shows wettability silver on the electronic ceramics, BaTiO₃. The wettability is essential for the electrodes on the condenser like the electronic ceramics. Wettability relates to surface tension in physics. We call an obtuse angle when θ is larger than 90°, then the situation is not wettable. On the other hand, we can see wettable condition when droplet figure brakes from a sphere like Figure 4 (2).

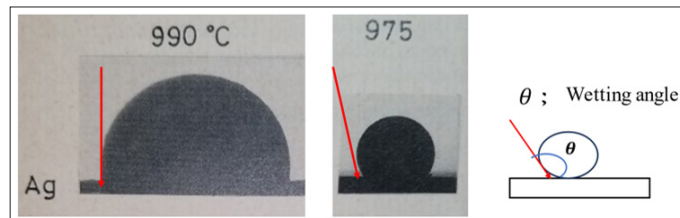


Figure 5: Wettability of liquid metal on the ceramics base during melting in the furnace

We can see the change of the wetting angle from the an obtuse angle during the furnace temperature from 975 to 990 °C (melting point is 962 approx.).

Therefore, the droplet of the active water may improve water's wettability.

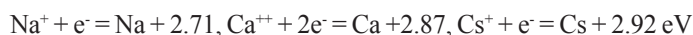
It is essential to our skin besides the internal organs (viscera).

Radiation Reduction from Human Body ---- Theory and Evidence

We reported radiation reduction of the Fukushima soils and withered grasses [25,26].

Here we discuss how to reduce radioactivity in the human body. Our method to reduce radioactive substances correspond to a basic idea.

Firs, most people tried to wash away Cs' absorption with rocks like zeolites, which are the silica containing sodium ion (Na) and calcium ion (Ca). However, Na and Ca ions are larger than cesium by 12~33 %, so it isn't easy to absorb cesium, forming almost oxide (Cs₂O) or hydroxide (CsOH) in the soils. We point out another item is reduction potential;



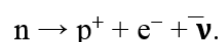
Difficulty of absorbance reactions with zeolites is remarkable from the viewpoint of reduction potential.

Therefore, we recommended drinking the active water, eating foods in the activated container, and putting the contaminated substances after a couple of days. Furthermore, we discuss the internal radiation exposure in Fukushima (2011/6).

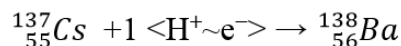
The activated good is a bracelet. One person had the exposure of 110~140 mSv/hr., we suggested putting the activated bracelet, then we measured 60~74 mSv/hr. of the dose rate after 15min. later. It is the reduction rate of 45% to 47%.

We consider the reason for reducing radioactivity from the radioactive substances.

The neutron disintegrates in the β decay of Cs as follows [27].



On the right side, $p^+ + e^-$ are an infoton exactly; namely, infoton may receive the decay energy from Cs so that infoton will be able to react with cesium nucleus. In this situation, the radiation field (or energy) from cesium may be essential to respond with spin and charge of the intron, namely, spinor field [28,29]. However, we do not refer to this theory here. Finally, we calculated both energy balance and mass balance as follows [30].



The results of the chemical analysis of ICP-MS indicate 72%, 21% and 7% of ^{138}Ba (^{137}Ba), ^{139}La and ^{140}Ce , respectively. Furthermore, our theoretical calculation shows 70~74%, 20~28% and 8~10% of Ba, La and Ce, respectively.

Conclusion

We employ the pico-extended particle water. We indicate the broken beaker test, no dripping from the meat in the activated bag by the MICA water, and the permeability of skin lotion in the activated bottle was more significant than the usual bottle, which phenomena are because of the smallness of the water. Furthermore, we discuss an activated bracelet and foods to relieve the internal radiation of the human body contaminated in Fukushima. We reported the Cs radiation reduction in the contaminated soils and withered grasses changing to stable Ba, La, and Ce after the reaction of radioactive cesium with the infoton.

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References

- Pauling L (1960) The Nature of Chemical Bond. 3rd ed, George Banta Company Inc, Tokyo (in Japanese) 2: 11-20.
- Elington JR, Dehenedetti PG (2001) Relationship between structural order and the anomalies of liquid water. *Nature* 409: 318-321.
- Novoa JJ, Mota F, Perez del Valle C, Plana M (1997) Structure of the first solvation shell of the hydroxide anion: A model study using $\text{OH}^- (\text{H}_2\text{O})_n$ ($n = 4, 5, 6, 7, 11, 17$) clusters. *J. Phys. Chem* 101: 7842-7848.
- Graphic Science (2017) Magazine Newton Miracle substance, Water, Special issue, Newton Presse, Tokyo.
- Pollack GH (2013) The Forth Phase of Water Beyond Solid, Liquid, and Vapor. Ebner & Sons Publishers. Seattle 357.
- Luzar A, Chandler D (1996) Hydrogen-bond kinetics in liquid water. *Letters to Nature* 379: 55-57.
- Cowan ML, Bruner BD, Huse N, Dwyer JR, Chugh B, et al. (2005) Ultrafast memory loss and energy redistribution in the hydrogen bond network of liquid H_2O . *Nature* 434: 199-202.
- Hatanaka K (1991) EU 0421563, (1990) JP 1786552, (1993) US.
- Sugihara S, Hatanaka K (2009) Photochemical Removal of Pollutants from Air or Automobile Exhaust by Minimal Catalyst Water. *Water* 1: 92-99.
- Sugihara S (2008) Japanese trademark patent of infoton (No. 5138668).
- Fleischmann M, Pons S (1989) Electrochemically induced nuclear fusion of deuterium. *J. Electroanalytical Chemistry* 261: 301-308.
- Evgeny F, Tatarkhanov M, Mitsui T, Rose M, Ogletree D, et al. (2006) Vibrationally assisted diffusion of H_2O and D_2O on Pd (1 1 1). *Surface Science* 600: 542-546.
- Notoya R, Noya Y, Ohnishi T (1996) Tritium generation and

large excess heat evolution by electrolysis in light and heavy water-potassium carbonate solutions with nickel electrodes. *Fusion Technology* 26: 179-183.

- Iwamura Y, Sakano M, Itoh T (2002) Element Analysis of Pd Complexes: Effects of D_2 Gas Permeation. *Japanese J. of Appl. Phys* 41: 4642-4648.
- Emsley J (1998) The Elements, 3rd Ed (Clarendon Press, Oxford) https://www.johnemsley.com/books/the_elements.html.
- Sugihara S, Igarashi T, Suzuki C, Hatanaka K (2014) Microscopic Approach to Water by Using the DV-X α Method, and Some Innovative Application; edited by Ishii T. Springer International Publishing, Switzerland Chapter 10: 257-289.
- Kozono D, Yasui M, King LS, Agre P (2002) King Aquaporin Water Channels: Atomic Structure and Molecular Dynamics Meet Clinical Medicine. *J. Clin. Invest* 109: 1395-1399.
- Yasui M, Hazama A, Kwon TH, Nielsen S, Guggino WB, et al. (1999) Rapid Gating and Anion Permeability of an Intracellular Aquaporin. *Nature* 402: 184-187.
- Woutersen S, Bakkar H J (1999) Resonant intermolecular transfer of vibrational energy in liquid water, *Letter to Nature* 402: 507-509.
- Zhang Q, Sabelli N, Bush V (1991) Potential energy surface of $\text{H}-\text{H}_2\text{O}$. *J. Chem. Phys* 95: 1080-1085.
- Scott JN, Vanderkooi JM (2010) A New Hydrogen Bond Angle/Distance Potential Energy Surface of the Quantum Water Dimmer. *Water* 2: 14-28.
- Smith JD, Christopher D C, Wilson KR, Messer BM, Cohen RC, et al. (2004) Energetics of Hydrogen Bond Network Rearrangements in Liquid Water. *Science* 306: 851-853.
- Sugihara S, Suzuki C, Hatanaka K (2011) The Mechanism of Activation of Substances by Minimal Catalyst Water and Application in Keeping Food Fresh, *Water* 3: 87-94.
- Adachi H (1993) Introduction of quantum materials chemistry: approach from DV-X α method, Sankyo Shuppan, Tokyo, in Japanese).
- Sugihara S (2013) Deactivation of Radiation from Radioactive Materials Contaminated in a Nuclear Power Plant Accident. *Water* 5: 69-85.
- Sugihara S (2015) Faster disintegration of radioactive substances using energy of specially-processed water and theoretical prediction of a half-life of radionuclide. *International Journal of Current Research and Academic Review* 3: s196-207.
- Konopinski Emil Jan (1943) Beta-Decay. *Rev Mod Phys* 15: 209-457.
- Yukawa H (1950) Quantum Theory of Non-Local Fields, Free Fields, Part I. *Phys. Rev* 77: 219-226.
- Yukawa H (1950) Quantum Theory of Non-Local Fields, Irreducible Fields and their Interaction, Part II. *Phys. Rev* 80: 1047-1052.
- Sugihara S (2018) Model for Transmutation of Elements using Weak Energy of Water leading to Faster Disintegration of Radionuclides. *Water* 10: 82-98.

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