**FORM 2**

THE PATENTS ACT, 1970 (39 of 1970)

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THE PATENTS RULES, 2003 COMPLETE SPECIFICATION

(See sections 10; rule 13)

**TITLE OF THE INVENTION**

A STUDY TO ANALYSE THE IMPACT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN NUCLEAR PHYSICS

**APPLICANT**

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A STUDY TO ANALYSE THE IMPACT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN NUCLEAR PHYSICS

*Technical Field*

[0001] The embodiments herein generally relate to a study to analyses the impact of artificial intelligence and machine learning in nuclear physics.

*Description of the Related Art*

[0002] The nuclear fusion reaction can be generated by colliding nuclei of hydrogen isotopes with each other directly. It is difficult to collide them with each other under ordinal conditions since hydrogen isotope molecules have very high potential barriers due to coulomb forces by electrons.

[0003] There have been made many trials for generating a high temperature plasma in a high density and confining it to cause so called thermal nuclear fusion reaction. In order to cause the thermal nuclear fusion reaction, it is theoretically considered to be necessary to realize a high temperature higher than two hundred million degrees and a product of the density and the confinement time of plasma equal to or higher.

[0004] The large amounts of heat energy may be liberated by nuclear fission or nuclear fusion. While heat from the fission of high atomic weight fuels has been used for many years to generate electricity, no practical method of using nuclear fusion to produce energy has been discovered.

[0005] The fusion research has centered on creating a plasma of low atomic weight constituents such as deuterium, helium, and tritium. Fusion reactions occur when the nuclei in the plasma are brought close enough together at a high enough energy to overcome the repulsive force between positively charged nuclei stripped of their electrons. This energy requirement is customarily expressed in terms of a temperature.

[0006] An energy from hydrogen atoms as their electrons are stimulated to relax to lower energy levels and smaller radii than the ground state by providing a transition catalyst which acts as an energy sink or means to remove energy resonant with the electronic energy released to stimulate these transitions according to a novel atomic model. The transition catalyst should not be consumed in the reaction. It accepts energy from hydrogen and releases the energy to the surroundings. Thus, the transition catalyst returns to the origin state. Processes that require collisions are common.

[0007] The low-energy nuclear reaction is also called chemical-assisted nuclear reaction, lattice-assisted nuclear reaction and condensed substance nuclear science, compared with the traditional thermonuclear fusion reaction, the reaction temperature is relatively low, the reaction products are mainly overheated and nuclear transmutation elements of used metals, high-energy electromagnetic radiation harmful to human bodies is not detected in the reaction process, and the reaction products do not have radioactivity.

[0008] The potential for generating electrical power from nuclear reactions was recognized, scientists have strived to devise the best methods of harnessing nuclear power and putting it to practical use. The main objectives of such research have been to create the most efficient methods of power conversion, power converters that can generate electrical power from nuclear power sources for sustained periods of time without maintenance, and smaller, more manageable power converters that can be used as everyday power sources. The sources of nuclear energy that scientists have sought to harness include nuclear fission, radiation and nuclear fusion . The present invention is designed to generate electrical power from energy produced from nuclear fission and/or radiation.

SUMMARY

[0009] In view of the foregoing, an embodiment herein provides a study to analyses the impact of artificial intelligence and machine learning in nuclear physics. An essential object of the present invention is to provide an apparatus capable of causing nuclear fusion reactions at a low temperature. An apparatus capable of causing nuclear fusion reactions in an electro- chemical process at a low temperature. Electrodes suitable for causing nuclear fusion reactions therein at a low temperature.

[0010] A cold fusion thermal generator is provided which uses the electrolysis of water in the electrolyte to pack hydrogen in a specially adapted cathode. The cathode comprises a matrix of boron and a molecular sieve that selectively adsorbs hydrogen and releases helium. An inert hydrogen adsorbing metal such as palladium or platinum may be included in the matrix to improve electrical conductivity. The anode comprises an electrically conductive chemically resistant metal such as Monel and preferably surrounds the cathode.

[0011] A current of suitable density and voltage is applied across the electrodes. Hydrogen is generated by electrolysis of water and adsorbed in the cathode at high densities. The protons fuse with the boron nuclei by the reaction.

[0012] The heat released by the reaction is transferred through the electrolyte in the pressurized vessel into a heat exchange fluid by conventional means. The helium formed from the alpha particles and oxygen from the electrolysis are vented from the cell. The rate of reaction may be controlled by controlling the rate of electrolytic hydrogen production.

[0013] A primary material comprising a predetermined amount of cluster nanostructures having a number of atoms of the transition metal lower than a predetermined number of atoms, keeping the hydrogen in contact with the clusters, heating

the primary material at an initial process temperature that is higher than a predetermined critical temperature, in particular by creating in the primary material a predetermined temperature gradient.

[0014] an energy conversion system comprising a radioactive element for generating a huge number of electrons undergoing free-to-free transition above the conduction-band in an avalanche cell and generating heat, wherein the electrons above the conduction-band are provided to an anode through a vacuum gap to generate avalanche cell power, and the heat is provided to a thermoelectric generator to generate thermoelectric power. In an embodiment, the avalanche cell material is irradiated with gamma rays, which excite and release a huge number of electrons within the avalanche cell material, generating a large amount of current through a thermionic process in the vacuum gap. In an additional embodiment, the thermoelectric generator and avalanche cell may comprise a dual power system providing thermoelectric power and avalanche cell power.

[0015] A nuclear voltaic cell with fissile material applied in a solid layer, and the layers of the nuclear voltaic cell axially opposed to each other and wound around a mandrel.

[0016] These and other aspects of the embodiments herein will be better appreciated and understood when considered in conjunction with the following description and the accompanying drawings. It should be understood, however, that the following descriptions, while indicating preferred embodiments and numerous specific details thereof, are given by way of illustration and not of limitation. Many changes and modifications may be made within the scope of the embodiments herein without departing from the spirit thereof, and the embodiments herein include all such modifications.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The embodiments herein will be better understood from the following detailed description with reference to the drawings, in which:

[0018] Fig. 1 illustrates a study to analyse the impact of artificial intelligence and machine learning in nuclear physics according embodiments herein; and

[0019] FIG. 2 illustrates a schematic diagram of the overall configuration of the low energy nuclear reactor apparatus of the present invention in which electromagnetically activated gases interact with metals to produce superheat according embodiments herein.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0020] The embodiments herein and the various features and advantageous details thereof are explained more fully with reference to the non-limiting embodiments that are illustrated in the accompanying drawings and detailed in the following description. Descriptions of well-known components and processing techniques are omitted so as to not unnecessarily obscure the embodiments herein. The examples used herein are intended merely to facilitate an understanding of ways in which the embodiments herein may be practiced and to further enable those of skill in the art to practice the embodiments herein. Accordingly, the examples should not be construed as limiting the scope of the embodiments herein.

[0021] Fig. 1 illustrates a study to analyse the impact of artificial intelligence and machine learning in nuclear physics according embodiments herein. The nuclear fusion reaction is a nuclear reaction in which light nuclei such as hydrogen isotope atoms are fused into a heavier atomic nucleus in contrast of the nuclear fission reaction in which heavy uranium atoms are fissured into lighter atoms accompanying a great deal of thermal energy.

[0022] The nuclear fusion reaction, it becomes possible to obtain a great deal of energy triple as large as that obtained in the nuclear fission reaction. Also, the nuclear fusion reaction is considered to be an ideal clean energy source since it is supposed to be caused in the sun.

[0023] A measuring occluding and releasing amounts of hydrogen isotopes in a hydrogen isotope gas while varying the pressure P, the component C and the temperature of the gas and for evaluating the electro-chemical properties of the alloy. The electrode can be made by the powder solidifying method, the powder sintering method, the machining method or the diecasting method.

[0024] The exact reaction mechanism of the nuclear fusion is not understood. However, the adsorbed hydrogen in the cathode is believed to fuse with nuclei by the reaction [0025] An energy hole is provided by the transfer of multiple electrons between participating species including atoms, ions, molecules, and ionic and molecular compounds. In one embodiment, the energy hole comprises the transfer of t electrons from one or more species to one or more species whereby the sum of the ionization energies and/or electron affinities of the electron donating species minus the sum of the ionization energies and/or

electron affinities of the electron acceptor species equals.

[0026] An energy hole of energy equal to the total energy released for a below ground state" electronic transition of the hydrogen atom is provided by the transfer of an electron between participating species including atoms, ions, molecules, and ionic and molecular compounds. In one embodiment, the energy hole comprises the transfer of an electron from one species to another species whereby the sum of the ionization energy of the electron donating species minus the ionization energy or electron affinity of the electron accepting species equals.

[0027] The amount of tritiums in the heavy water is increased about five times as much as that before the reaction. This indicates that the nuclear fusion reaction was caused at a room temperature.

[0028] The first reason why the nuclear fusion reaction can be realized at a room temperature easily is that the density of deuterium in the cathode can be increased greatly and the second reason is that the affinity of the alloy of the present invention to deuterium is high. [0029] The deuterium gas was charged in a high-pressure resistive reaction container

of stainless steel to make an alloy material occlude hydrogen isotopes.

[0030] A raw material such as Ti, Zr and the like were weighed so as to have a composition of a desirable amorphous alloy not having a crystal lattice rule of a long period and charged into a melting pot of quartz. The melting pot was put in a high-frequency induction heating furnace and the charged raw-materials were melted in an innert gas directly and the molten obtained was rapidly cooled using a single roll forming method. Alloy material thus obtained has a shape of strip, ribbon or plate. Part of the alloy material was used for analyzing properties thereof such as atomic composition, crystal structure, homogeneity and the like and the rest thereof was used for measuring hydrogen isotope occlusion-releasing characteristic of the alloy in the hydrogen isotope gas measurement and for evaluating electro-chemical properties.

[0031] The plate-like amorphous material can be used for the cathode directly. The cathode can be formed using powder solidifying method, powder sintering method, machining method, diecasting method.

[0032] FIG. 2 illustrates a schematic diagram of the overall configuration of the low energy nuclear reactor apparatus of the present invention in which electromagnetically

activated gases interact with metals to produce superheat according embodiments herein. The low-energy nuclear reaction apparatus and the method for generating heat by the action of electromagnetic trigger gas and metal. The low-energy nuclear reaction device and the method for generating heat by the action of electromagnetic trigger gas and metal to generate overheat of the invention are not limited.

[0033] The electrical resistance of the gases leaving the device was also measured. The resistance measured ranges, which proves the presence and therefore the formation of plasma. The electrical resistance of hot air measured at the same temperature without reaction as defined in the invention is therefore these conditions

[0034] The proportion of certain chemical elements already present before operation changes, and chemical element bodies not present before operation are appeared.

[0035] This is proof of the presence of nuclear fusion and transmutation reactions corresponding to the reactions that can be found in a black hole. There is fusion because one sees the atoms of Chromium being transformed into atoms of Iron by contribution of atomic weight and transmutation because one sees the atoms of Nickel being transformed into atoms of Iron by loss of atomic weight.

[0036] The proportion of certain chemical bodies already present before operation changes, and chemical bodies not present before operation have appeared.

[0037] The device where the wall of the enclosure or reactor was pierced under the action of fusion, the applicants analyzed two faces of the residual portion removed from the wall.

[0038] The disappearance of chromium, nickel, the formation of certain chemical elements such as magnesium, cobalt, titanium, phosphorus, sulfur constitute proof of the

presence of fusion reaction and transmutation inside the enclosure. The applicants have also observed that during operation particles were emitted by the outer surfaces of the so-called reactor enclosure of the device. This emission was detected and analyzed by detecting traces of particle impact on a plastic material of the polymethyl methacrylate type, known as acrylic glass.

[0039] The Liquid Semiconductor is a solid at room temperature and is deposited between the Ohmic Contact and the Schottky Contact. the layers of the Nuclear Voltaic Cell are fabricated using thin film technology. In a preferred embodiment of the invention, once the layers of the Nuclear Voltaic Cell have been fabricated, the Nuclear Voltaic Cell is heated so as to melt the Liquid Semiconductor. Optimum operating temperatures will vary depending upon the properties of the Liquid Semiconductor used.

[0040] The art that liquid semiconductors other than selenium may be employed. Over particular ranges of temperature and composition, liquid semiconductors may be formulated from pure chalcogens. Among other possibilities, suitable liquid semiconductors include mixtures of chalcogens, and alloys of chalcogens with metals. In a preferred embodiment of the present invention, after initial heating by an external source, the heat generated from the nuclear material maintains the temperature of the Nuclear Voltaic Cell.

[0041] An external electrical power source is used to heat the Nuclear Voltaic Cell and liquefy the semiconductor. In an alternative embodiment, the Liquid Semiconductor is liquid at room temperature and the present invention does not have to be heated prior to operation.

[0042] The non-fissile radioactive isotopes may be used to provide lower power outputs with less associated radiation. This type of power source is more practical for use in devices that are in close proximity to a human operator because a lightweight radioactive shield

can be placed around the device. Such a power source is well suited for use in space vehicles and military equipment where high power outputs are not required and a smaller device that is not highly radioactive is necessary.

[0043] The coupling interactions of gamma ray photons are extremely violent and excite the shell electrons from their probability space and nucleus. These phenomena can be explained by four main processes: the photoelectric and photonuclear effects, Compton scattering, and electron/positron pair production. Low-energy photons can cause electrons in the valence band to undergo a bound-to-free transition through the photo-electric effect, while the higher energy photons may interact with electrons in the intra-bands or inner-shells or with the nucleus to develop Thomson or Compton scattering and/or pair production. As a gamma ray penetrates matter, the energy deposited by absorption is proportional to the absorption cross-section, the atomic weight of matter, and the thickness. The interaction of gamma photons with atomic intra-band electrons through any of the photoelectric, photonuclear, Compton scattering, and pair production processes deposits enough energy to produce and sustain the secondary and tertiary electrons as an avalanche process.

CLAIMS

I/We Claim:

1. 1. A method a study to analyses the impact of artificial intelligence and machine learning in
2. nuclear physics, wherein the method comprises:
3. an electrode for use in an apparatus for causing nuclear fusion reactions at a low
4. temperature being characterized in that said electrode is made of an alloy being capable of
5. occluding hydrogen isotopes;
6. the electrode for use in an apparatus for causing nuclear fusion reactions at a low
7. temperature being characterized in that said electrode is formed as a sphere;
8. an electrode for use in an apparatus for causing nuclear fusion reactions at a low
9. temperature being characterized in that said electrode is made of an amorphous metal
10. or alloy not having a crystal lattice rule of long period as a main component;
11. an apparatus for conducting cold fusion comprising an electrically conductive anode;
12. an electrically conductive cathode comprised of a constituent for selectively
13. adsorbing hydrogen nuclei and releasing larger nuclei, and boron, a vessel for containing said
14. electrodes, an electrolyte means to vent gaseous reaction products; and means to carry away
15. the heat generated by said fusion;
16. placing a liquid semiconductor between two metal contacts, wherein said first metal
17. contact creates a low resistance contact with said liquid semiconductor and said second metal
18. contact creates a Schottky contact with said liquid semiconductor;
19. receiving photons and thermal waves emitted from a radioactive material at a Nuclear
20. Thermionic Avalanche Cell;
21. outputting avalanche electrons using in part the received photons;
22. guiding the avalanche electrons to cross over a vacuum gap to reach a receptor
23. electrode under an applied bias voltage to allow the avalanche electrons received by the
24. receptor electrode to run through a quantum well structure for ultrafast mobility to a power
25. circuit.

Dated 7th day of January 2023

Signature

ABSTRACT

A STUDY TO ANALYSE THE IMPACT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN NUCLEAR PHYSICS

5 An electrode for use in an apparatus for causing nuclear fusion reactions at a low temperature

being characterized in that said electrode is made of an alloy being capable of occluding hydrogen isotopes. The electrode for use in an apparatus for causing nuclear fusion reactions at a low temperature being characterized in that said electrode is formed as a sphere. An electrode for use in an apparatus for causing nuclear fusion reactions at a low temperature

10 being characterized in that said electrode is made of an amorphous metal or alloy not having a

crystal lattice rule of long period as a main component. receiving photons and thermal waves emitted from a radioactive material at a Nuclear Thermionic Avalanche Cell. Outputting avalanche electrons using in part the received photons.

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