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TITLE: SUSTAINED ENERGY GENERATOR BASED ON AUTOCATALYTIC INTERACTIONS

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FORM 2

THE PATENTS ACT 1970

[39 OF 1970]

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THE PATENTS RULES, 2003

PROVISIONAL SPECIFICATION

[See section 10; Rule 13]

TITLE: "SUSTAINED ENERGY GENERATOR BASED ON AUTOCATALYTIC INTERACTIONS"

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The following specification particularly describes the invention and the manner in which it is to be performed

TECHNICAL FIELD

This invention relates to a process for producing excess heat by a sustained energy generator based on autocatalytic interactions or low nuclear reactions. This invention particularly refers to a process for the generation of excess heat by heating Nickel/Palladium in a hydrogen/deuterium sealed reactor, which causes autocatalytic interactions or low nuclear reactions, resulting in excess heat generation, which is extracted by passing air around the reactor.

BACKGROUND OF THE INVENTION

The idea of the excess heat generation is being experimented in some countries like Japan, China, Italy, but the results have not produced heat in a sustained manner continuously. Whereas, in the claimed invention, as a result of autocatalytic interactions, excess heat is produced in a continuously sustainable manner.

OBJECTS OF THE INVENTION

The primary object of the current invention is to generate excess heat continuously using autocatalytic interactions or low energy nuclear reactions. Another object of the current invention is to use the generated heat as a source of electricity/energy.

A further object of the current invention is to make the heat generation sustainable and commercially available.

Another object of the current invention is the utilization of electricity/energy produced by military, government, private people and commercial agencies as a source of energy. A further object of the current invention is to achieve the utilization of heat produced in cold regions and regions where conventional energy access is difficult.

Another object of the current invention is to be used as an alternate method of generating heat and energy other than using nuclear fission and fusion, which is cheaper, safer and user friendly.

SUMMARY OF THE INVENTION

The present disclosure is a process for developing a sustainable, eco-friendly and stand alone source of energy based on autocatalytic interactions or Low Energy Nuclear Reaction. The setup produces excess heat continuously when Nickel/Palladium is heated with D_2 (deuterium) gas. The setup consists of a reactor body which houses the Nickel/Palladium mesh with Hydrogen/deuterium gas filled within it, the reactor is connected to a 50Hz supply voltage. When the mesh is heated to a certain temperature constantly, due to autocatalytic interactions, sustained excess heat is generated in the reactor in a continuous manner. This excess energy given by the reactor is extracted by passing air around it and the heated air in turn is used to generate electricity.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig 1 represents the experimental setup of the invention.

DETAILED DESCRIPTION OF THE INVENTION

While the embodiments in the disclosure are subject to various modifications and alternative forms, specific embodiment thereof has been shown by way of example, wherein the production process of excess heat energy has been described below. It should be understood, however, that it is not intended to limit the disclosure to the particular forms disclosed, but on the contrary, the disclosure is to cover all modifications, equivalents, and alternatives falling within the scope of the disclosure. It is to be noted that a person skilled in the art would be motivated from the present

disclosure and may modify various components or parts, which may vary from application to application. However, such modifications should be construed within the scope and spirit of the present disclosure.

The present disclosure refers to a process for the generation of excess heat energy by a generator based on autocatalytic interactions.

The entire process is divided into multiple individual processes – preparation of the detailed and thorough execution procedure, review of the procedure and amendments when needed, preparation of the sample, experimental execution phase, process monitoring, data logging and post-experiment analysis of the sample and data obtained.

The experimental sample to be heated is kept in a reactor. The reactor is a customized and engineered cylindrical enclosure which houses the reaction components. The reactor is designed in such a way that it can house the electrical heating components along the core of the cylinder and parallel to the axis. Provision to introduce either Deuterium or Hydrogen gas or vacuum into the enclosure as per requirement and at a desired pressure are also provided. The entire reactor is made of Stainless Steel and either end of this enclosure is closed using a customized flange assembly. The leak tightness of the reactor is ensured by using specially designed gaskets in-between the flanges and the reactor body, accounting for the thermal expansion coefficient. The entire reactor is assembled inside a fiber-glass box with the dimensions of 680mm x 730mm x 380mm. The fiber glass box contains 2 holes with 25mm radii. Since the reactor is placed inside the fiber-glass box, heat generated by the reactor is captured and directed by the air circulated inside the reactor.

Sample Preparation and cleaning procedures: Nickel mesh with mesh size of 200

initially cut into 6 smaller pieces of 20 cms x 15 cms. Each piece is washed with household detergent in distilled water and scrubbed using a scrubbing pad. This process

removes the visible impurities from the mesh. After washing the mesh and drying them, with sandpaper of grit sizes of 600, 800, 1200 and 1500 are used for improving the cohesion properties of the surface. After rubbing the surface, the roughed up mesh surface is cleaned using a vacuum cleaner to remove dust of Nickel from the surface. Once the dust is removed, the mesh is washed again using mild detergent in distilled water and scrubbed again using the scrubbing pad. After washing the mesh, the mesh is soaked at 90°C in boiling distilled water for 1 hour. After soaking and drying, the dried mesh is then cleaned using Ethyl Alcohol. This process of cleaning the mesh removes impurities like oil from the mesh surface and also roughens up the surface of the mesh.

Once the meshes are dried, they are weighed independently 4-5 times till consistent weight is obtained for each mesh. The value is noted down for each mesh separately. After noting down the values, subsequently the sheets are mechanically treated coating with particles of Palladium by sequentially applying pressure through a soft Palladium rod. This is done to ensure that Palladium gets deposited inside the crevices of the Nickel mesh which was already roughened up by the cleaning process. After rubbing with Palladium, each mesh is weighed again to calculate the amount of Palladium deposited. All the meshes are stacked and rolled and placed inside the reactor. Inside the reactor, the meshes are unrolled and placed in a way that ensures maximum contact with the surface of the reactor vessel.

Sealing and pre-experimentation process: Once the sample is kept inside the reactor, it is sealed using the flange-gasket assembly. Sealed reactor is then kept inside the glass-fiber box and all the thermocouples used for temperature measurement are connected to the Data Acquisition system module. The reactor temperature is monitored at 5 different places using 5 different thermocouples of K type and R type. One thermocouple measures heater

temperature, one measures the outer wall temperature of the reactor, one measures inlet air temperature, one measures outlet air

temperature and one spare thermocouple also measures the outlet air temperature. The heating element is connected to a single phase, 50Hz AC power supply capable of supplying power in incremental steps of our desired value.

A vacuum pump connected to the reactor is turned on. The pump connection is provided in parallel to the gas inlet. Absolute pressure of a few Pascals (Pa) is maintained inside the reactor for 2 hours during the entire period when the pump is kept on. After 2 hours, the vacuum pump is turned off and the reactor is heated to 100- 120°C for about 20 hours. After 20 hours of heating, the reactor is cooled to room temperature and vacuum is applied again till the pressure reads a few Pascals again. This process of applying vacuum again removes impurities like oxides of Nickel in the mesh. The above process of removal of impurities is repeated many times to ensure the removal of all trapped gases inside the reactor. During the entire process, at any phase if leakage is observed, the leakage point is identified and the point is fixed. The entire process is restarted and all the steps involved in the process are carried out again.

Once the vacuum pump is turned off, the reactor is heated again to 200°C and maintained for 2 hours. After 2 hours, the reactor is cooled back to room temperature and vacuum is applied again till the pressure read is a few Pascals. Vacuum pump is turned off once the desired pressure is attained and D_2 gas is filled into the reactor at 100-300 Pa pressure. Proper care is taken to ensure the pressure inside the reactor is between 1 Pa and 6000 Pa. The setup is not disturbed for 2 hours to allow absorption of gas. Heating is again started after 2 hours of dwelling time. The process of letting the meshes absorb D_2/H_2 gas is repeated until there is no drop seen in the gas pressure.

Experimental process: Once the reactor assembly is ready, heating is started and power is increased in incremental steps based on the temperature of the surface of the

reactor using a variable power source. Power is increased in incremental steps of 25 W, 50 W, 100 W, 150 W, 200 W and 300 W using a variable power supply with

sufficient time interval between every individual step. For each individual power level, all the thermocouple readings at core, surface, air inlet and outlets, reactor gas pressure and volumetric air flow are recorded. These parameters are acquired and logged for calculations of output power and in-turn the excess heat generated by the reactor. Graphical representation of the data acquired is monitored on a regular basis to check for any anomalies.

Air Calorimeter process: Air calorimeter setup is used for measuring the excess heat generated by the reactor. The reactor is enclosed using a dumb-bell shaped enclosure so that the air can capture and carry maximum amount of heat from the reactor. Diverted air flow method is used to carry the heat from the system by varying the direction of conventional air flow between the air inlet and the outlet ducts. This enclosure is so designed that the airflow is along the surface of the reactor vessel ensuring maximum heat removal from the system.

For each value of power input applied, the difference in air temperature are noted and excess heat generated and measured through Calorimeter is calculated using the formula:

$$\mathbf{Q = mC_p\Delta T}$$

Where m = Volumetric mass of air circulated, C_p = specific heat of air, ΔT = difference in the temperature of Air Outlet to Air Inlet

With the value of electrical power kept constant, the difference in air temperature determines the heat carried out by the air. Measurements of air flow is carried out by a hot wire anemometer which helps in determining the volumetric mass of the flow of air. The excess

power generated by the system is determined by the difference in the input supplied to the heat output carried out by the air. Calibration runs are carried out

to accurately estimate the heat losses to the surroundings through conduction, convection and radiation. Further, the reactor can be turned off and turned as excess heat generator.

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