The BetaVolt Ion Battery Can Power Your Car For 50 Years Per Charge

A 25-Year Battery that never runs your motor!!??

A novel battery we designed uses an energy storage system that is not usually powerful enough to directly power your car motor or laptop but it does provide something that other power solutions cannot. It charges your car master power batteries forever, 24/7, day or night and never runs out of juice before your car or notebook are no longer owned by you.

Betavoltaic devices, also known as **betavoltaic cells**, are generators of electric current, in effect a form of battery, which use energy from a radioactive source emitting beta particles (electrons). A common source used is the hydrogen isotope, tritium. Unlike most nuclear power sources, which use nuclear radiation to generate heat, which then is used to generate electricity (thermoelectric and thermionic sources), betavoltaics use a non-thermal conversion process; converting the electron-hole pairs produced by the ionization trail of beta particles traversing a semiconductor.[1]

Betavoltaic power sources (and the related technology of alphavoltaic power sources[2]) are particularly well-suited to low-power electrical applications where long life of the energy source is needed, such as implantable medical devices or military and space applications.[1]

Betavoltaics were invented over 60 years ago.[*vague*] Some pacemakers in the 1970s used betavoltaics based on promethium,[3] but were phased out as cheaper lithium batteries were developed.[1]

Early semiconducting materials weren't efficient at converting electrons from beta decay into usable current, so higher energy, more expensive—and potentially hazardous—isotopes were used. The more efficient semiconducting materials used today can be paired with relatively benign isotopes such as tritium, which produce less radiation.[1]

The Betacel was considered the first successfully commercialized betavoltaic battery. The use of diamond-encapsulated carbon-14 to be extracted from nuclear waste was proposed in 2016 as a very long lived betavoltaic source.[4]

The primary use for betavoltaics is for remote and long-term use, such as spacecraft requiring electrical power for a decade or two. Recent progress has prompted some to suggest using betavoltaics to trickle-charge conventional batteries in consumer devices, such as cell phones and laptop computers.[5] As early as 1973, betavoltaics were suggested for use in long-term medical devices such as pacemakers.[3]
Although betavoltaics use a radioactive material as a power source, the beta particles used are low energy and easily stopped by shielding, as compared to the gamma rays generated by more dangerous radioactive materials. With proper device construction (that is, proper containment), a betavoltaic device would not emit dangerous radiation. Leakage of the enclosed material would engender health risks, just as leakage of the materials in other types of batteries leads to significant health and environmental concerns.[6]

As radioactive material emits, it slowly decreases in activity (refer to half-life). Thus, over time a betavoltaic device will provide less power. For practical devices, this decrease occurs over a period of many years. For tritium devices, the half-life is 12.32 years. In device design, one must account for what battery characteristics are required at end-of-life, and ensure that the beginning-of-life properties take into account the desired usable lifetime.

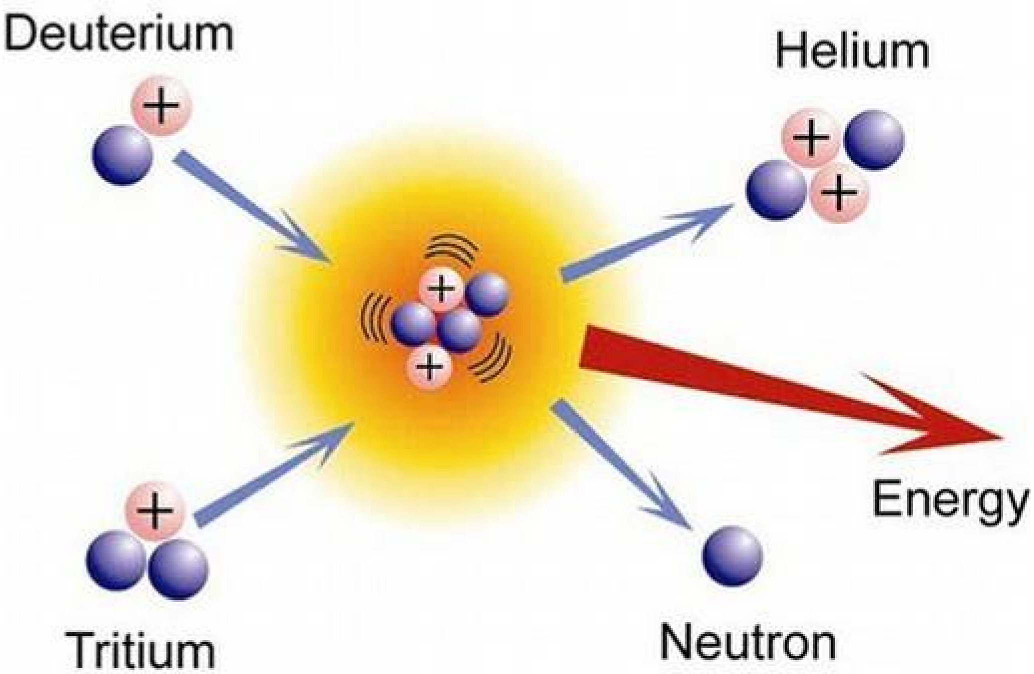
Liability connected with environmental laws and human exposure to tritium and its beta decay must also be taken into consideration during risk assessment and product development. Naturally, this increases both time-to-market and the already high cost associated with tritium. A 2007 report by the UK government's Health Protection Agency Advisory Group on Ionizing Radiation declared the health risks of tritium exposure to be double those previously set by the International Commission on Radiological Protection located in Sweden.[7]

Long-lived power supplies for remote and even hostile environmental conditions are needed for space and sea missions. Nuclear batteries can uniquely serve this role. In spite of relatively low power, the nuclear battery with packaging can have an energy density near a thousand watt-hours per kilogram, which is much greater than the best chemical battery. It would reason that small devices would need small batteries to power them.

The world of tomorrow that science fiction dreams of and technology manifests might be a very small one. Tritium is a radioactive isotope of hydrogen that typically is produced in nuclear reactors or high energy accelerators. It decays at a rate of about five percent per year (half of it decays in about 12 years). It gives off radiation in the form of a beta particle. Tritium will bind anywhere hydrogen does, including in water, and in plant, animal and human tissue. It cannot be removed from the environment once it is released. Tritium can be inhaled, ingested, or absorbed through skin if it is not pre-sealed in glass and other encapsulants.

Moreover, radioactive isotopes are available on the market for reasonable prices ($1000) and low power electronics are becoming increasingly more versatile. Therefore, nuclear batteries are commercially relevant today.

Symbol: H (H-3)
Atomic Number: 1(Protons in Nucleus)
Atomic Weight: 1(naturally occurring H)

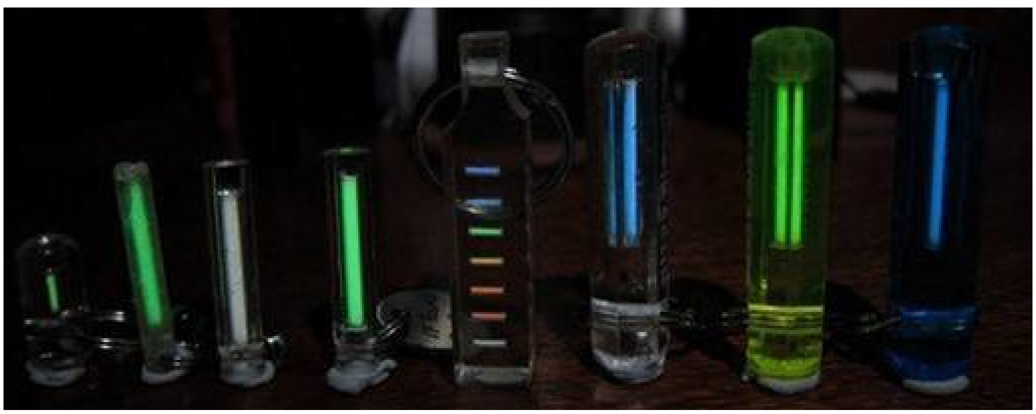


What is Tritium?

Tritium is the only radioactive isotope of hydrogen. The nucleus of a tritium atom consists of a proton and two neutrons. This contrasts with the nucleus of an ordinary hydrogen atom (which consists solely of a proton) and a deuterium atom (which consists of one proton and one neutron). Ordinary hydrogen comprises over 99.9% of all naturally occurring hydrogen. Deuterium comprises about 0.02%, and tritium comprises about a billionth of a billionth (10-16 percent) of natural hydrogen.

What is Isotope?

An isotope is a different form of an element that has the same number of protons in the nucleus but a different number of neutrons.



Alpha radiation:

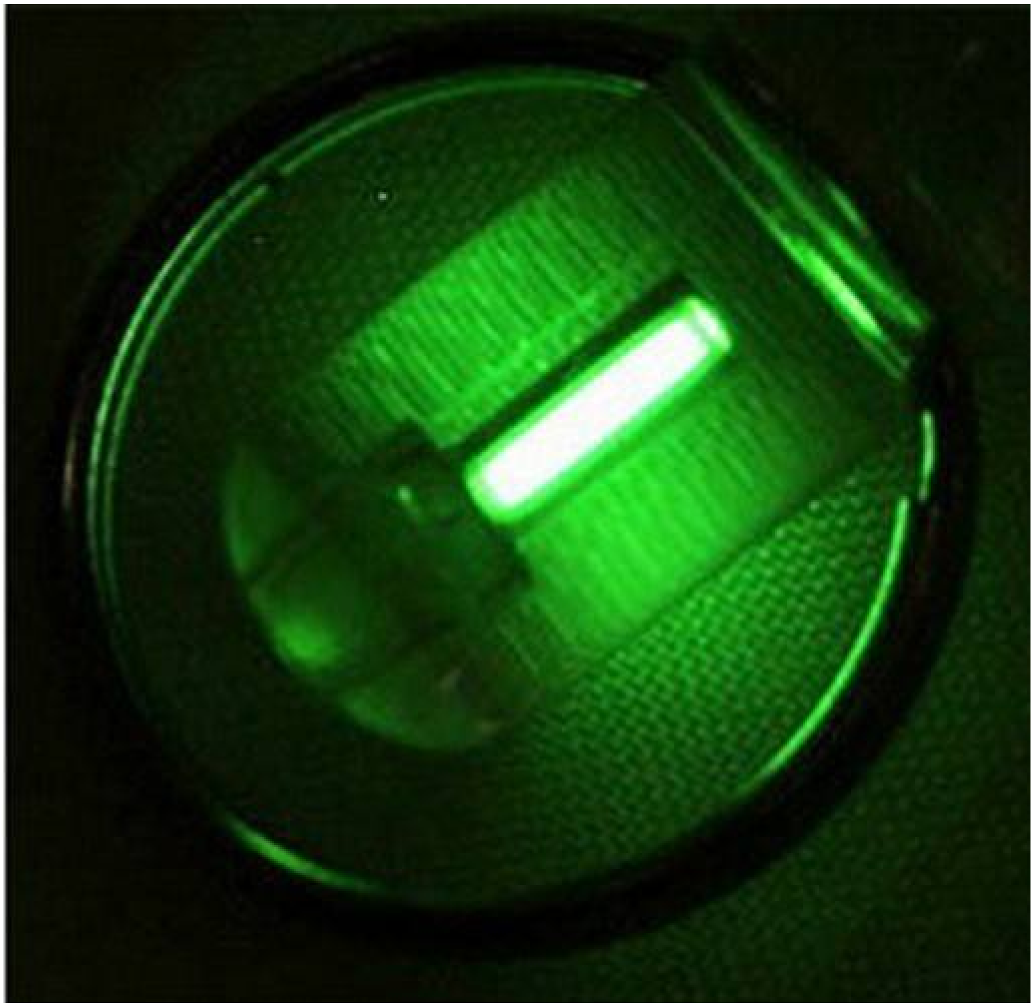
Alpha particles are Helium nuclei (2 protons and 2 neutrons) . These particles are relatively heavy and have poor penetrating power being over 90% blocked by a sheet of paper.

Beta Radiation:

Beta radiation (high speed electrons or photons) can penetrate paper.

Gamma Radiation:

Gamma radiation which can penetrate Aluminium.



How to produce a Tritium?

Tritium can be made in production nuclear reactors, i.e., reactors designed to optimize the generation of tritium and special nuclear materials such as plutonium-239. Tritium is produced by neutron absorption of a lithium-6 atom. The lithium-6 atom, with three protons and three neutrons, and the absorbed neutron combine to form a lithium-7 atom with three protons and four neutrons, which instantaneously splits to form an atom of tritium (one proton and two neutrons) and an atom of helium-4 (two protons and two neutrons).

Direct Radio Isotope Converts:

Radioisotope power conversion, in which the energy from the decay of radioisotopes is used as a power source, allows powering of applications which are unsuited to power sources such as photovoltaics or generators or to batteries. These applications are typically remote, not accessible to any external energy source (including sunlight), and often must last between 5 to 50 years. They include not only space, but also small power sources for biomedical uses. Radioisotope thermal generators (RTGs) are often used to convert the energy from the radioisotope by, converting it to heat, and then converting the heat to electricity via either a thermoelectric device, or thermophotovoltaics (TPV). Alternately, the radioisotope may be directly converted into electricity via betavoltaics, in which the energy from a beta particle creates electron holes pairs which are collected and used to generate power similar to a solar cell.

MORE:

•Atomic battery
•Diamond battery
•Optoelectric nuclear battery
•Radioisotope thermoelectric generator
•Radioisotope piezoelectric generator
•PVDF Thinfilm technology

- Jump up to:***a b c d*** A 25-Year Battery: Long-lived nuclear batteries powered by hydrogen isotopes are in testing for military applications, Katherine Bourzac, Technology Review, MIT, 17 Nov 2009.
- NASA Glenn Research Center, Alpha- and Beta-voltaics (accessed Oct. 4, 2011)
- ^ Jump up to:***a b*** Olsen, L.C. (December 1973). "Betavoltaic energy conversion". *Energy Conversion*. Elsevier Ltd. **13** (4): 117–124, IN1, 125–127. doi:10.1016/0013-7480(73)90010-7.
- **Jump up^** http://www.thechemicalengineer.com/latest%20news/2016/november/diamond-battery-made-from-nuclear-waste.aspx
- **Jump up^** "betavoltaic.co.uk". Retrieved 21 February 2016.
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