Science World Publishing

Open Access Journal | Volume: 1.1

JOURNAL OF ADVANCED MATERIAL SCIENCE AND INNOVATIONS

Crossref

Diamond Battery, Endless Energy from Nuclear Waste

Fatih AKAY

Chemistry Teacher, Chemist, Class time and Google Certified Educator, Yüzüncü Yıl University, Romania

Article Information

Article Type: Prospective Study
Journal Type: Open Access
Volume: 1 **Issue:** 1
Manuscript ID: JAMSI-1-104
Publisher: Science World Publishing

Received Date: 27 June 2020
Accepted Date: 05 July 2020
Published Date: 10 July 2020

***Corresponding author:**

Fatih AKAY

Chemistry Teacher
Chemist
Class time and Google Certified Educator
Yüzüncü Yıl University
Romania
Email: akayfatih@hotmail.com

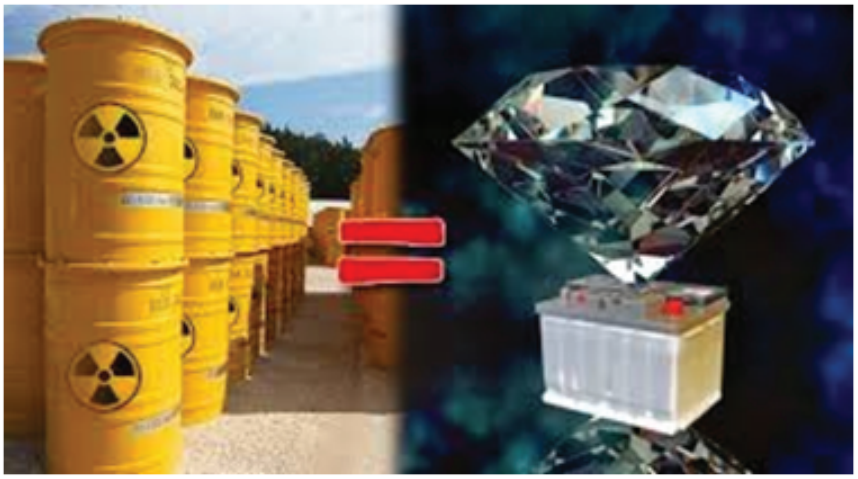
Citation: Fatih AKAY (2020) Diamond Battery, Endless Energy from Nuclear Waste. J Adv Mater Sci Innov, 1(1);1-2

INTRODUCTION

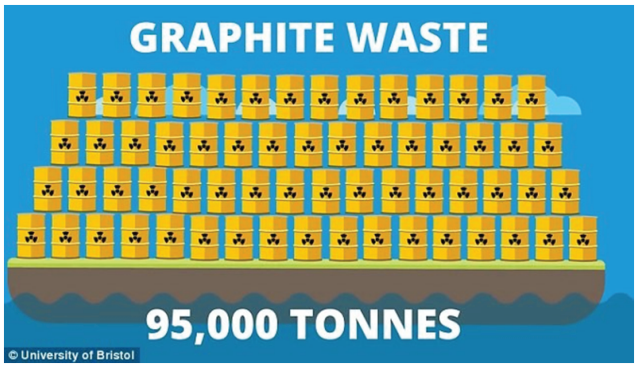
Diamond battery is the name of a prototype battery proposed by the University of Bristol Cabot Institute during their annual lecture [1] held on 25 November 2016 at the Wills Memorial Building. This battery is proposed to run on the radioactivity of waste graphite blocks (previously used as neutron moderator material in nuclear reactors) and would last for thousands of years.

The battery, developed by the University of Bristol, is a betavoltaic cell using carbon-14 (C-14) in the form of diamond-like carbon (DLC) as the beta radiation source, and additional normal-carbon DLC to make the necessary semiconductor junction and encapsulate the carbon-14 [2].

We can develop a way to use a type of nuclear waste to generate electricity in a nuclear-powered battery that is an actual diamond.



What we're going to talk about in this article looks exactly like a sci-fi movie, but it's real. The diamond battery designed by researchers is obtained from nuclear waste and does not lose its power for 15 thousand years. Of course, not everything is so easy. But let's start the story. Uranium used in nuclear power plants is broken down by nuclear fission method. As atoms break down, the heat generated turns water into steam and is transferred to turbines that generate electricity. The reverse of this process is the remaining radioactive waste at the end of the process. Wastes are buried in the bottom of the earth with graphite cores, but remain radioactive for 10 thousand years.



The researchers heated this radioactive graffiti and obtained a radioactive gas. When this gas is exposed to very high temperatures and pressures, as in nature, artificial diamonds are obtained in the laboratory. The interesting thing is that these man-made nuclear diamonds produce a small electric current when exposed to a radioactive field. So you get a diamond battery. Scientists buried this battery in another non-radioactive diamond and prevented harmful radiation [1-4].

We can make synthetic diamond that, when placed in a radiation field, was able to generate a small electrical current. And the radioactive field can be produced by the diamond itself by making the diamond from radioactive carbon-14 extracted from nuclear waste [1-9].

Even better, the amount of radioactivity in each diamond battery is a lot less than in a single banana. The normal way to produce electricity is to use energy, like burning coal or capturing wind, to move a magnet through a coil of wire to generate a current. However, a diamond is able to produce a charge simply by being subjected to a radiation field. There are a million tons of such graphite blocks around the world and this would be a great use for them, a use that would reduce their radioactivity and the cost to dispose of them. The cost to produce a diamond is a lot less than disposing of used nuclear fuel and nuclear waste, even though we know how to dispose of nuclear waste safely and cheaply.

CONCLUSION

But the power output of the diamond battery is continuous and doesn't stop. The radioactive diamond battery would still be putting out 50% power after 5,730 years, which is one half-life of carbon-14 or about as long as human civilization has existed. During this time, the diamond battery would have produced over 20 million Joules. And would produce another 10 million during the next 5,730 years. So these batteries would be useful in situations where you could not, or would rather not, replace the battery, such as in pacemakers or in spacecraft and satellites.

Conflict of Interest: Author not mentioned any conflict of interest

Acknowledgements: No Acknowledgements

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