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Self Recharging Perpetual Paper Batteries

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Abstract: - In this paper we describe about a paper battery whose electrodes are made up of different metals. This battery is connected to the primary coil of a transformer. The secondary coil of the transformer is connected to full wave rectifier whose output is either connected to a super capacitor or a rechargeable battery. The whole of the setup is referred as Self Recharging Perpetual Paper Battery.

Keywords: - *Paper Battery , Perpetual Battery, Self Recharging Battery.*

I. INTRODUCTION

Traditionally, electronics have been designed around their batteries. In recent years, however, a new battery, known as the paper battery, has been developed that can easily conform to the size and shape of various electronics. Isabel Ferreira et.al reported about a paper battery that is self rechargeable [1]. In reference [1], they reported on the use of cellulose paper simultaneously as electrolyte, separation of electrodes, and physical support of a rechargeable battery. Cu is used as anode and Al is used as cathode. Victor L. Pushparaj et.al reported Flexible energy storage devices based on Nano composite paper [2]. In reference [2] they reported a power density of 1.5 $kW.kg^{-1}$ (energy density $\geq$ 13Wh/kg). In this paper we report about a assembly of capacitor (made up of two different metals), transformer and full wave rectifier together which we name as Self Recharging Perpetual Paper Batteries. It is well known that in an LC circuit, the oscillations will not fade out even after reaching the equilibrium. In section II, the principle behind the vacuum energy is discussed. In section III, the self recharging perpetual paper batteries is discussed. Section IV concludes this paper.

II. GIBBS FREE ENERGY, VACUUM ENERGY AND CONTACT POTENTIAL

In thermodynamics[3], the **Gibbs free energy** (IUPAC recommended name: **Gibbs energy** or **Gibbs function**; also known as **free enthalpy** to distinguish it from Helmholtz free energy) is a thermodynamic potential that measures the "usefulness" or process-initiating work obtainable from a thermodynamic system at a constant temperature and pressure (isothermal, isobaric). Just as in mechanics, where potential energy is defined as capacity to do work, similarly different potentials have different meanings. The Gibbs free energy (SI units J/mol) is the *maximum* amount of non-expansion work that can be extracted from a closed system; this maximum can be attained only in a completely reversible process. When a system changes from a well-defined initial state to a well defined final state, the Gibbs free energy ΔG equals the work exchanged by the system with its surroundings, minus the work of the pressure forces, during a reversible transformation of the system from the same initial state to the same final state.

Vacuum energy [4] is an underlying background energy that exists in space throughout the entire Universe. The effects of vacuum energy can be experimentally observed in various phenomena such as spontaneous emission, the Casimir effect and the Lamb shift, and are thought to influence the behavior of the Universe on cosmological scales. Using the upper limit of the cosmological constant, the vacuum energy in a cubic meter of free space has been estimated to be 10^{-9} joules. However, in both Quantum Electrodynamics (QED) and Stochastic Electrodynamics (SED), consistency with the principle of Lorentz covariance and with the magnitude of the Planck constant requires it to have a much larger value of 10^{113} joules per cubic meter. This huge discrepancy is known as the vacuum catastrophe. In Conventional batteries electrolyte is used during recharge. In our battery vacuum energy is used for recharging. The vacuum energy is assumed to be filling every part of space and time. It is this vacuum energy which is used to charge the parallel plates of the primary tank circuit.

The enthalpy of making or enthalpy of formation of each metal is different. It is this enthalpy difference which is used to extract the energy from the super capacitor system and the same energy is restored by the vacuum energy which is assumed to be filling the entire universe.

The **Volta potential** (also called **Volta potential difference**, **contact potential difference**, **outer potential difference**, $\Delta\psi$) in electrochemistry[5], is the electrostatic potential difference between two metals (or one

metal and one electrolyte) that are in contact and are in thermodynamic equilibrium. Specifically, it is the potential difference between a point close to the surface of the first metal, and a point close to the surface of the second metal (or electrolyte). It is this contact potential difference between two different metals is extracted in this paper. Potential means the ability to do work as usual in physics.

III. SELF RECHARGING PERPETUAL BATTERY

The working principle of any battery is explained in the following few steps.

Enthalpy is defined as follows.

H = U+PV

Helmholtz free energy is defined as follows.

F = U-TS

Gibbs free energy is defined as follows.

G = U-TS+PV

= H+F-U

If $F = N_A e$

$\Delta G = -nFE_0$ (1)

n = number of electrons transferred / mole

$\Delta G = -RT \ln K$ (2)

From eq. (1)&(2), the cell voltage is obtained as follows.

$$E^o_{cell} = \frac{RT}{nF} \ln K$$

Where K is the chemical equilibrium constant.

The working principle is very simple. If two dissimilar metals are brought into contact then depending on the enthalpy of formation i.e. the one which is having higher enthalpy of formation will pass on its extra energy to the one with lower enthalpy so as to reach equilibrium. If they are not brought into contact and made as capacitor and then connected to an inductor to form a tank circuit, the tank circuit will oscillate forever and the extra energy will be supplied by the vacuum energy forever. Here Tank circuit means literally a Tank of energy forever. This is the first ever perpetual machine reported in the modern history of physics.

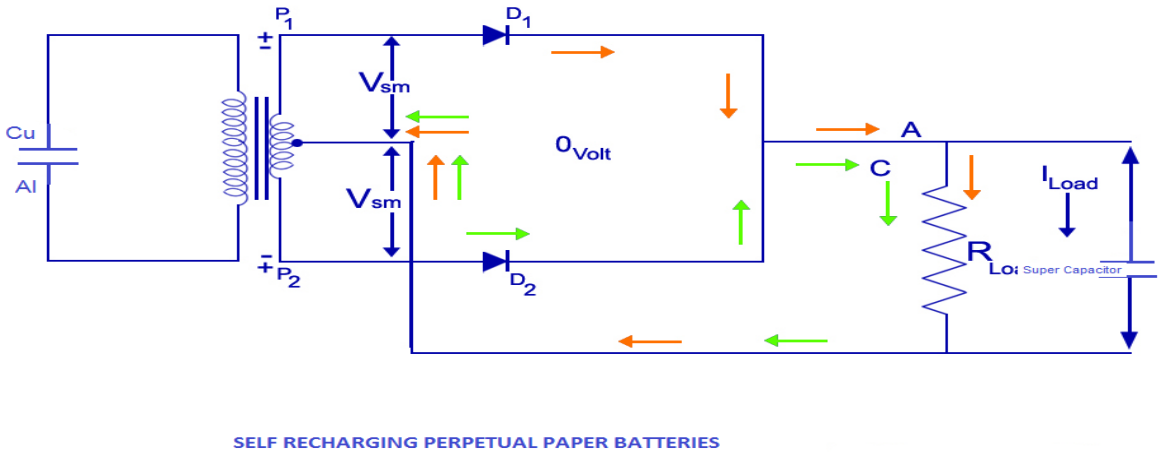

Figure 1: Schematic diagram of a self-recharging perpetual paper battery.

IV. CONCLUSION

Thus we have reported the first ever perpetual machine in the modern history of physics. This assembly will work forever provided that copper plate is laminated and it is kept under sun shine. Even it will work in night as well because in the night, the ambient temperature is greater than 273.15^0K and the vacuum energy will do the function of recharging.

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[5] http://en.wikipedia.org/wiki/Volta_potential