

Quantum Power Cell – Discovery By Joel Lagace

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Introduction:

For quite some time, we've understood the traditional galvanic process involving two dissimilar metal electrodes, also termed as a galvanic cell. This mechanism primarily relies on an electrochemical reaction, where the rate of metal degradation and oxidation generates a potential difference known as voltage. This voltage can be utilized to power very low voltage

and current devices. While such cells have not been renowned for high current output, occasionally, one may extract a few milliamps from them. Nonetheless, they serve as intriguing conversation pieces in the rudimentary realms of electrical science.

However, there exists a lesser-known secondary process akin to galvanic action. In this process, electrodes need not necessarily be metallic but must possess differing conductive values. We're examining the electron megavolt value against another, thereby creating an electrostatic potential difference between the two plates. The challenge lies in identifying a substance or compound that replicates the function of the electrolyte solution in a traditional galvanic cell. This substance completes the 'bridge,' enabling a loop of current generation. For some time now, exotic materials and compounds exhibiting these properties have been known, albeit mostly inaccessible to the average person.

What is a solid state Electrolyte?

A solid-state electrolyte is a material that conducts ions (charged particles) but is in a solid rather than liquid or gel form. In traditional electrolytes, which are typically found in batteries and fuel cells, ions move through a liquid or gel medium. However, in solid-state electrolytes, ions move through a solid lattice structure.

The benefits of solid-state electrolytes are numerous, especially in the context of applications like the one being discussed. Here's how they relate to our application and their importance:

Improved Safety: Solid-state electrolytes are generally safer than liquid or gel electrolytes because they are non-flammable and less prone to leakage. This is particularly important in portable or wearable devices where safety is a concern.

Enhanced Stability: Solid-state electrolytes offer improved chemical and electrochemical stability, which can lead to longer device lifetimes and better performance over time. This stability is crucial for continuous and reliable operation, especially in long-term applications.

Reduced Corrosion: Solid-state electrolytes can help mitigate corrosion effects on electrodes, leading to longer-lasting and more durable devices. This is essential for maintaining consistent performance and efficiency over the device's lifetime.

Compatibility with High Voltage: Solid-state electrolytes can operate effectively at higher voltages, making them suitable for applications requiring high energy densities. This compatibility is advantageous for achieving higher power outputs and better overall performance in energy storage devices.

Environmental Robustness: Solid-state electrolytes are less dependent on environmental conditions such as temperature and humidity compared to liquid electrolytes. This makes them more reliable and consistent in various operating environments, which is crucial for outdoor or

extreme conditions.

The Role Of Solid State Electrolytes

In the context of the application being discussed, which involves creating a novel power generation system, solid-state electrolytes play a crucial role in providing a stable and long-lasting energy source. By using solid-state electrolytes, the system can achieve improved safety, reliability, and efficiency, ultimately leading to better overall performance and usability. Additionally, the reduced corrosion and enhanced stability offered by solid-state electrolytes contribute to the longevity and sustainability of the system, making it a viable solution for various practical applications.

The inherent advantage of such a meticulously engineered system lies in the ability to select non-corrosive electrodes. Theoretically, this could result in a continuous voltage potential for an indefinite period, or at least as long as the device remains operational and properly maintained. Admittedly, this device would operate at low current levels as a trade-off. However, it offers the prospect of a sustained source of potential. Established devices like the Zamboni pile come to mind, primarily relying on electrostatic properties. These devices utilize nothing more than a thin layer, typically a paper-like substance, to serve as the electrolyte, effectively bridging ions and electrons. While such systems predominantly operate on an electrostatic scale, owing to the proximity of the plates, and perhaps a modicum of capacitance, they are firmly rooted in well-established scientific principles, dating back quite some time.

My research embarks from this juncture, driven by the quest to identify a widely available substitute for these exotic alternatives. The aim is to democratize experimentation, enabling anyone, anywhere to achieve similar effects. While I'm aware of methods such as crystal growth, as demonstrated by Bidini and others in the community, I find them less appealing. Each batch of crystals tends to differ significantly, with varying piezoelectric properties. Mass-producing such cells would therefore be less than ideal. Nonetheless, there is potential for them to power an LED with the aid of an oscillator circuit.

The rationale behind my pursuit:

The rationale behind my pursuit of a solid-state electrolyte stems from several advantages it offers. Firstly, it significantly reduces corrosion effects on the electrodes, leading to enhanced efficiency. Acting as a bridge to complete our loop and initiate energy interactions, the solid-state electrolyte is pivotal for the functioning of our system. Compared to traditional methods, utilizing a solid-state electrolyte results in a more stable version of devices like the Zamboni pile. In this setup, the centerplate serves as a dielectric, akin to a capacitor, facilitating compatibility

with the electrodes at greater efficiency. Moreover, the reliance on environmental moisture is significantly reduced, as we explore other systems for electron flow, including quantum tunneling possibilities and other non-traditional electron flow mechanisms.

Alternatives to traditional solid-state electrolytes:

Through rigorous research and experimentation, I sought alternatives to traditional solid-state electrolytes. While initially exploring polymer fibers, I found them to be prohibitively expensive and suboptimal for experimentation purposes. However, I then discovered polyethylene glycol 3350, or PEG 3350, which intrigued me due to its electret-like properties. Remarkably, PEG 3350 can achieve these properties at very low temperatures and voltages, unlike traditional methods that necessitate dielectrics with high melting points. This alternative enables us to achieve similar results at much lower voltages. Additionally, I found that PEG 3350 exhibits electrolyte properties, prompting the idea of mixing it with other compounds. By incorporating this substance, along with electrodes, I envisaged creating a hybrid self-conditioning electret. As the cell generates its own potential difference and establishes the field, it solidifies into a solid-state cell with a standing voltage of approximately 1.5 volts DC, possessing electric-like properties. Moreover, I discovered that these cells can be further conditioned at lower voltages, enhancing the output to close to two volts per cell. This self-regenerative capability and versatility make them promising candidates for various applications.

Subsequently, I embarked on a series of experiments involving the addition of various substances to the mix. I conducted meticulous observations and subjected the cells to diverse conditions to assess their performance comprehensively. Through this process, I uncovered several anomalies, which I will delve into in greater detail later in this report.

Under specific conditions and with different variants of the electrolyte mix, wherein PEG served as the primary ingredient, I observed a range of phenomena. These included properties akin to memristors, self-oscillation, capacitance, resistance, transient AC generation, and static potential.

I explored numerous compounds as additives, including liquid sports electrolyte mix, various irons and minerals, ceramics, cement mixes, plaster mixes, and copper oxide powder. Each variant exhibited slight differences in behavior, with the most intriguing effects manifesting in the presence of copper oxide.

Secondary Systems Facilitating Electron Flow in Dry State:

a. Electrostatic Potentials:

In a dry state, electrostatic potentials can play a significant role in facilitating electron flow.

Electrostatic potentials arise from the presence of charged particles or surfaces, which create electric fields that influence the movement of electrons.

These electric fields can induce electron migration or polarization effects within nearby materials, enabling the transfer of charge even in the absence of a liquid or gel medium.

b. Quantum Tunneling:

Quantum tunneling is a phenomenon in quantum mechanics where particles, such as electrons, can pass through potential energy barriers despite lacking sufficient energy to overcome them classically.

In the context of electron flow in dry states, quantum tunneling can allow electrons to traverse barriers within solid-state electrolytes, facilitating charge transfer even in the absence of a liquid medium.

This effect can be particularly relevant in nanoscale structures or materials with low-dimensional features, where quantum mechanical effects become more pronounced.

c. Other Effects:

Other effects that could facilitate electron flow in dry states include surface interactions, defect-mediated conduction, and interface phenomena between different materials.

Interface phenomena between materials with different electronic properties can lead to charge transfer mechanisms like Schottky barriers or band alignment effects, influencing electron flow behavior.

Overall, while solid-state electrolytes offer unique advantages such as improved stability and safety, understanding secondary systems like electrostatic potentials and quantum tunneling can provide insights into electron flow mechanisms in dry states, contributing to the development of efficient energy storage and conversion technologies.

Observations:

First Experiment:

The initial experiment involved mixing the PEG electrolyte with a few drops of water, ensuring a thick yet translucent consistency. This mixture was then allowed to dry for approximately 24 hours at room temperature, until the cell hardened sufficiently to hold the electrodes in place without tipping over. Subsequent voltage measurements yielded around 1.2 volts. Identical cells underwent additional conditioning as electrets, achieved by heating them in an oven set to a low temperature, as PEG melts at relatively low temperatures. The cells were carefully monitored during this process, ensuring they reached a fluid-like gel state just before the

electrodes would tip over. Afterward, the cells were removed from the oven, cooled in a freezer, and solidified over approximately half an hour while connected to a 9-volt battery, with positive and negative terminals aligned accordingly. Following this treatment, the voltage increased to around 2 volts. Upon settling for over two weeks, the voltage remained relatively stable, dropping to approximately 0.5 volts and maintaining consistency in a completely dried state. Interestingly, this voltage reduction closely resembled the behavior observed in Bedini crystals. Remarkably, the addition of just a drop of water reactivated the cell to its initial 1.5 volts for a few days. Cells that underwent additional conditioning as electrets exhibited minimal potential decrease, while those left untreated dropped to around 0.5 volts but remained stable.



Figure A – Quantum Dry Cell Powering Small Loads

Second Experiment:

The second experiment closely mirrored the first, with the addition of a squirt of sports electrolyte to the mix. The inclusion of minerals appeared to enhance the cell's capacitive effects. When subjected to reverse pulsing at the lowest square wave frequency, the cell exhibited a greater output and occasionally entered self-oscillation cycles. Interestingly, cells from the first experiment, which lacked the sports electrolyte, did not display this behavior.



Figure B – Pulsing the Cell in Reverse – Greater Output From Cell

A notable outcome of adding the sports electrolyte was the ability to utilize two similar metals and observe a potential of around 0.2 volts. While this voltage was relatively weak, it indicated the presence of an alternative system or systems, distinct from a traditional galvanic cell. Despite attempts, this behavior could not be replicated with the peg mix alone. This led to the hypothesis that certain minerals in the sports mix functioned as mini internal cells, with the electrodes acting as conductors for energy transfer.

Third Experiment:

In the third experiment, I opted to use the PEG electrolyte mix and incorporated copper oxide powder. The objective was to enhance electron conductivity once the solid-state electrolyte dried. Interestingly, this mixture appeared to offer additional benefits, such as forming a protective layer on the electrolyte. The resulting mixture exhibited a more solid, brick-like consistency upon drying, reducing susceptibility to breakage. Moreover, I observed that the presence of copper oxide in the mix prevented voltage drop even after two weeks of

observation.

Furthermore, I conducted reverse pulsing experiments, and this particular cell demonstrated the most aggressive response to the pulse compared to other variations. This observation suggests that the addition of copper oxide enhanced the cell's reactivity and responsiveness to external stimuli.

Conclusion:

It appears that if you're focused on harnessing the electret-only effects of the PEG electrolyte, it's preferable to maintain its original composition and simply mix it with a small amount of water, as outlined in the first experiment. However, for those interested in integrating both features to leverage the cell as a power source, the optimal configuration seems to involve the addition of copper oxide to the mix.

In my experiments, I incorporated approximately two tablespoons of copper oxide, resulting in a 50-50% consistency mix between the PEG and the copper oxide. This mixture yielded a dark appearance. This configuration demonstrated enhanced performance and versatility, suggesting that the inclusion of copper oxide facilitates a synergistic interaction between the electret properties of the PEG and the conductive properties of copper oxide.

Taking to production:

Through my experimentation with these cells, I've been able to generate a few milliamps of power, sufficient to operate an LED, a small motor, or even a clock module. This output can be extended by charging the cells with a capacitor beforehand. Let's conservatively estimate our output at one milliamp at around 1.5 volts. Now, let's revisit some basic Ohm's law calculations in the context of series DC systems.

Consider a scenario where we have one 12-volt battery capable of delivering 1200 watts in one hour. Now, if we connect two of these batteries in series, creating a 24-volt system:

The total power output would be 2400 watts (24 volts * 100 amps) in one hour.

In a traditional system, one would incur costs for charging, along with input losses, resulting in no net financial gain at this point. However, the dynamics change significantly if the initial charge and continuous re-gauging are not a financial concern, as seen in the case of our quantum power cells. This feature transforms the landscape. All we need to do is construct a flawless quantum cell Zamboni-like stack. Let's delve into some calculations:

Let's recalculate:

Total Voltage:

$$\text{Total Voltage} = 120 \text{ cells} \times 1.5 \text{ volts/cell}$$

$$\text{Total Voltage} = 180 \text{ volts}$$

Total Current:

$$\text{Total Current} = \text{Individual Cell Current} \times \text{Number of Cells}$$

$$\text{Total Current} = 1 \text{ mA} \times 120$$

$$\text{Total Current} = 120 \text{ mA} = 0.12 \text{ amps}$$

Total Power:

$$\text{Total Power} = \text{Voltage} \times \text{Current}$$

$$\text{Total Power} = 180 \text{ volts} \times 0.12 \text{ amps}$$

$$\text{Total Power} = 21.6 \text{ watts}$$

So, with each cell producing 1 mA, the total current would be 120 mA (0.12 amps), and the total power output would be 21.6 watts at 180 volts. This is intriguing! However, it's crucial to emphasize how a series DC power source operates. We aim to use identical batteries, all charged to the same voltage, as the series connection will utilize the current value of the lesser of the cells. If you're utilizing the same batteries or an internal battery with all its cells pre-configured, you don't need to worry about this. But if we were to manufacture these cells from scratch, symmetry becomes crucial. Each cell needs to be identical in space and other specifications. Achieving this uniformity with today's technology is feasible, assuming proper setup.

Now, let's explore further. What if we stack five of these cells with today's technology? They could each be about a foot long, containing all these wafers, and when stacked together, they could occupy the space equivalent to a fat Tesla coil secondary typically used for home demonstrations, specifically the portable kinds. This comparison helps provide a sense of scale. So, let's delve into more calculations:

Therefore, with each cell producing 1 mA, the total power output would be 21.6 watts at 180 volts.

Now, if you connect five sets of these cells in parallel, each set producing 1 mA, the total current would indeed increase to 600 mA (0.6 amps) while maintaining the voltage at 180 volts.

Total Power = Voltage × Current

Total Power = 180 volts × 0.6 amps

Total Power = 108 watts

So, connecting five sets of these cells in parallel would yield a total power output of 108 watts at 180 volts.

The Final Word

This configuration presents a practical and robust power source that could sustain continuous output for over 25 years if the cells are constructed with precision adhering to these fundamental principles. Moreover, it could serve as a dependable backup power source for recharging large batteries repeatedly. It's important to note that this calculation considers only the inherent potential of the cells; the built-in electret field is not factored into the equation. As demonstrated, harnessing the electret capacitor's properties through pulsed output enhances performance, leveraging both the battery's constant potential and the electret's ability to rapidly self-recharge for subsequent pulses. To achieve this, an old-fashioned analog vibrator module, commonly found in vintage radios and vacuum tube systems for power supply switching, can be utilized to pulse the cell to 180 volts at 60 hertz, significantly amplifying the base value of 108 watts.