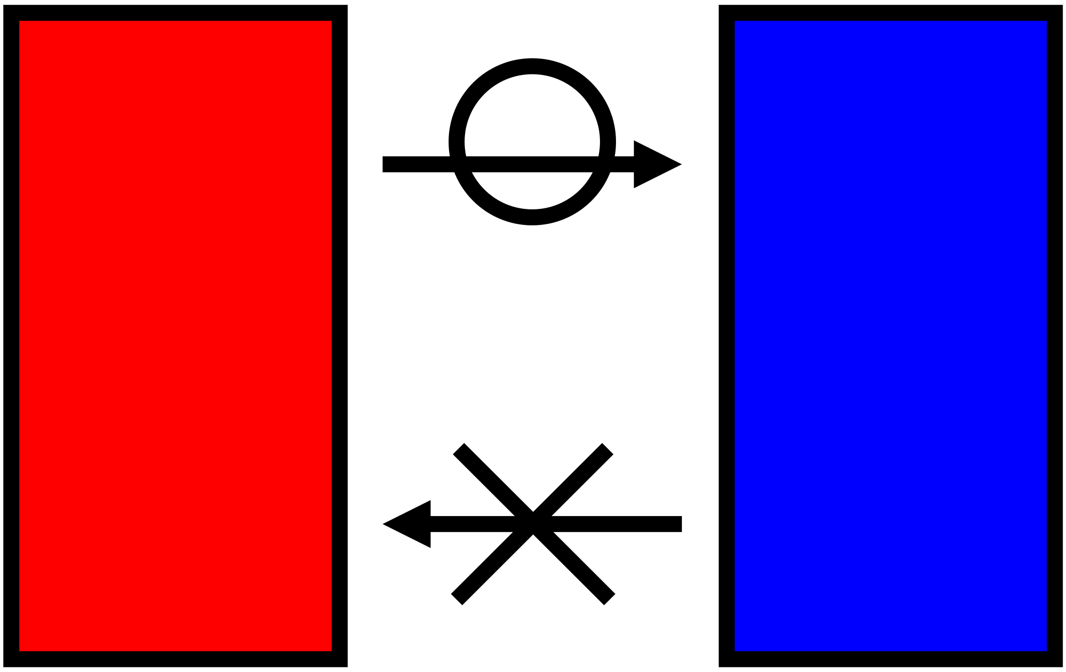
Could an exception to the second law of thermodynamics rewrite the world's energy rules?

If the fundamental rules governing energy were to change, could it help reverse the global warming crisis?

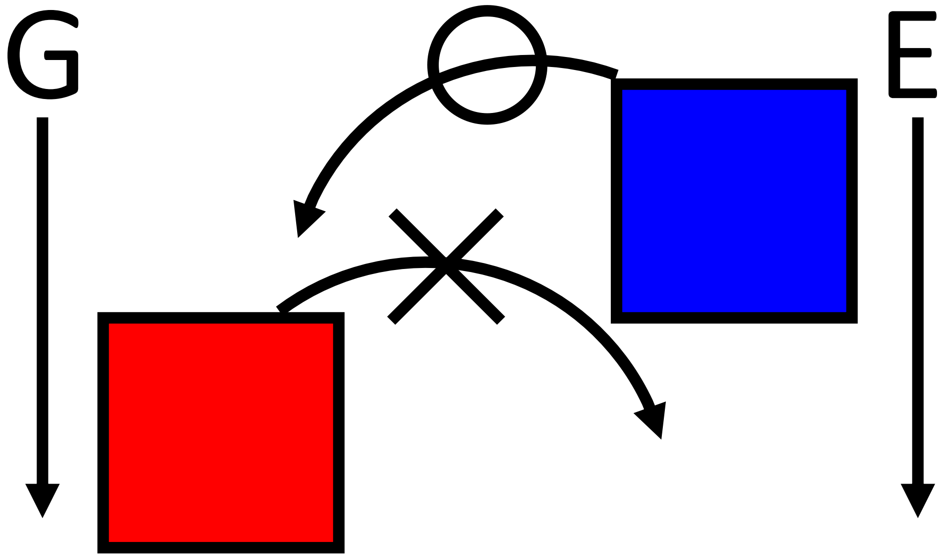
In the realm of science, few laws are regarded as unshakable truths like the second law of thermodynamics. This principle does more than define the limits of heat engine efficiency—it deeply influences our understanding of time. Some scientists even argue that time moves forward because entropy can only increase, never decrease.

Although entropy may seem like an abstract concept, it essentially describes the degree of disorder or how energy disperses within a system. The core idea of the second law states that heat always flows from a hotter region to a colder one—it never moves in the opposite direction. Likewise, disorder in a system will always increase rather than decrease.



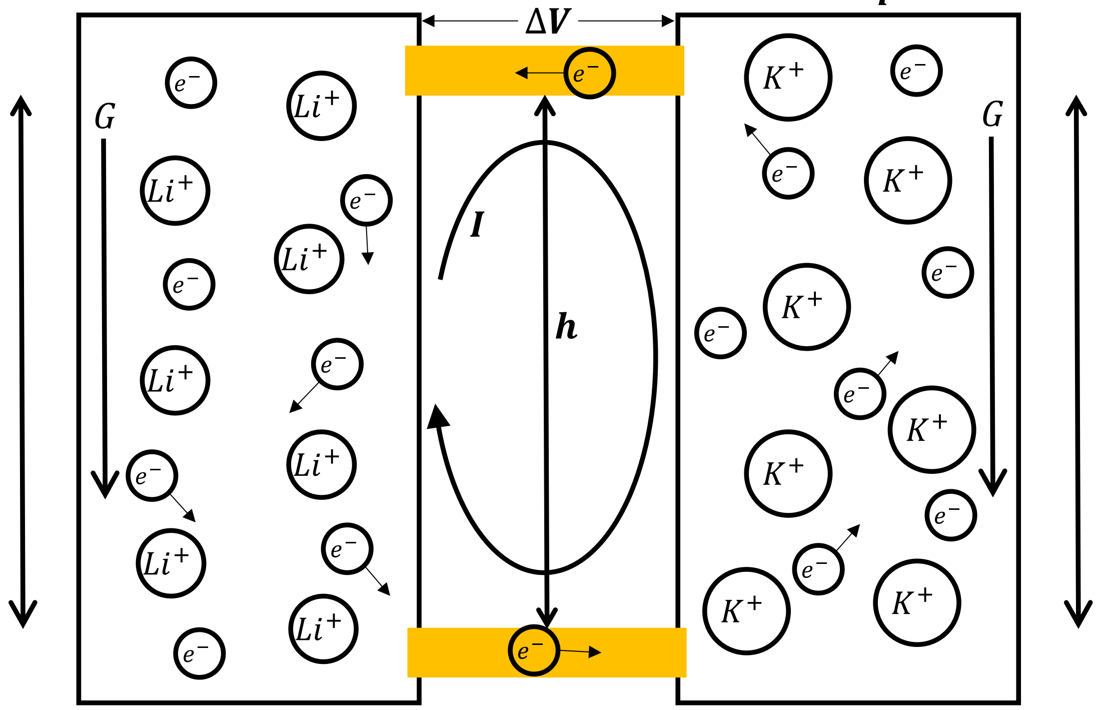
But what if exceptions exist? What if chaotic thermal vibrations could be converted into stable electrical energy—even in the absence of a temperature difference? What if entropy could actually reverse its direction?

Would such a phenomenon challenge our fundamental understanding of energy utilization? Could it even prompt a revision of thermodynamic principles as we know them?



This is not a scene from a science fiction novel—it is a real phenomenon observed in our research team's experiments.
So far, no one has been able to pinpoint any errors in our theoretical argument regarding an exception to the second law of thermodynamics. We have spent a year and a half attempting to publish our findings, but journals consistently struggle to find suitable reviewers.
Chemistry journals claim that our explanation, based on plasma theory, falls under physics, while physics journals argue that it involves the Nernst equation and should be considered electrochemistry. As a result, neither side is willing to take responsibility, and no reviewers are willing to endorse the paper.

$$\Delta V = \frac{(m_{K^+} - m_{Li^+})Gh}{2q} > 0$$

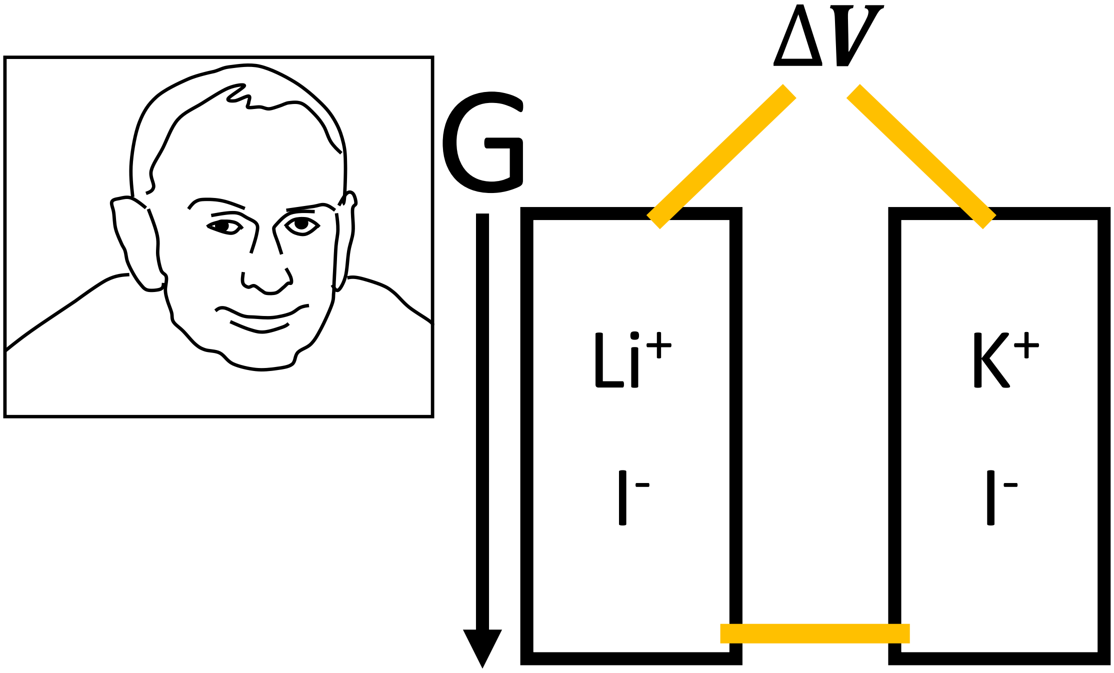


However, on preprint platforms, our paper has gained significant attention, with over 100 downloads in just 50 days. I have also sent more than 5,000 emails to physics and chemistry professors worldwide, asking them to identify flaws in our reasoning. So far, several professors have acknowledged the validity of our work. Yet, to this day, no one has been able to explain where our argument goes wrong.

Can chaotic thermal vibrations directly generate electricity?

The origins of this idea go back more than a century.

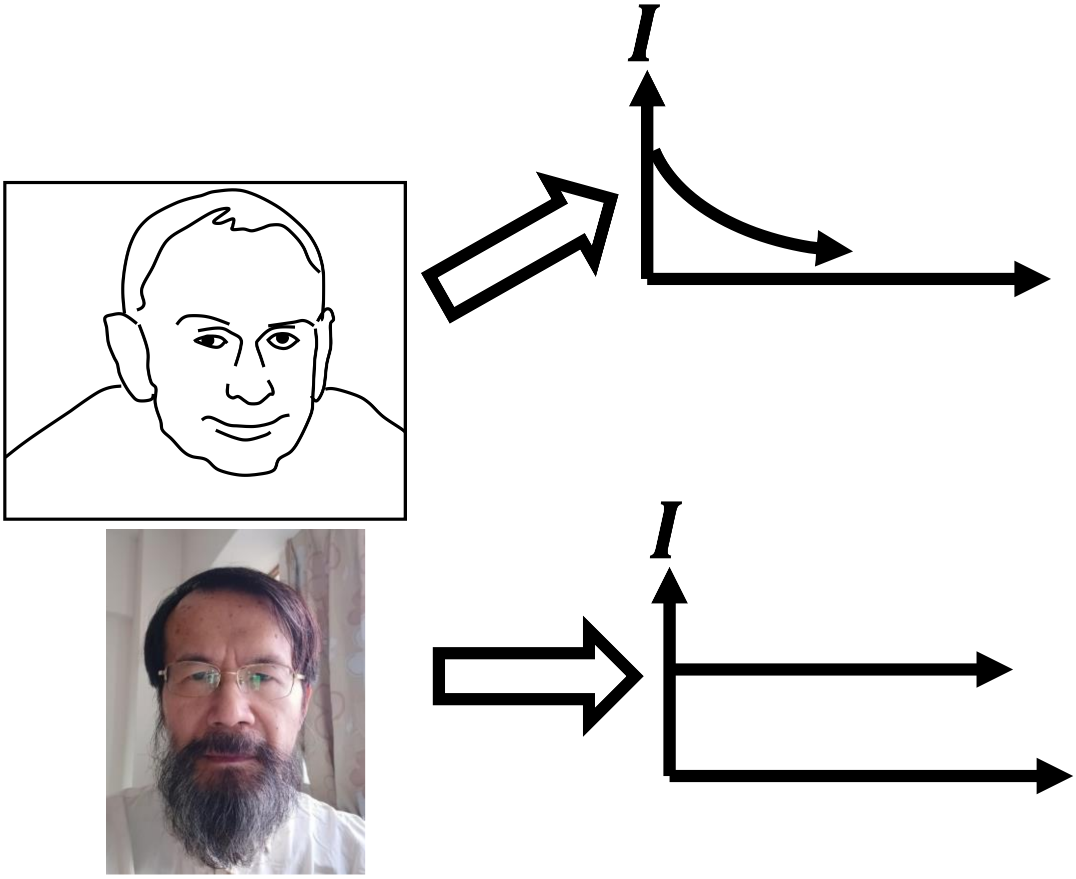
In 1910, physicist R.C. Tolman discovered that when certain electrolyte solutions containing different ions—such as lithium iodide (LiI) and potassium iodide (KI)—were placed in a spinning centrifuge, they developed distinct voltage distributions. This suggests that ions with different masses respond differently to acceleration (or gravity), creating a measurable voltage difference.



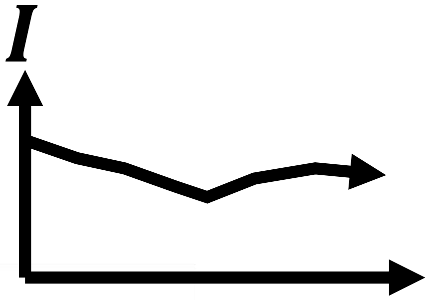
Tolman interpreted this effect as a temporary polarization phenomenon, meaning that once current starts flowing, the accumulated charge at both ends would cancel out the voltage. However, we see things differently.

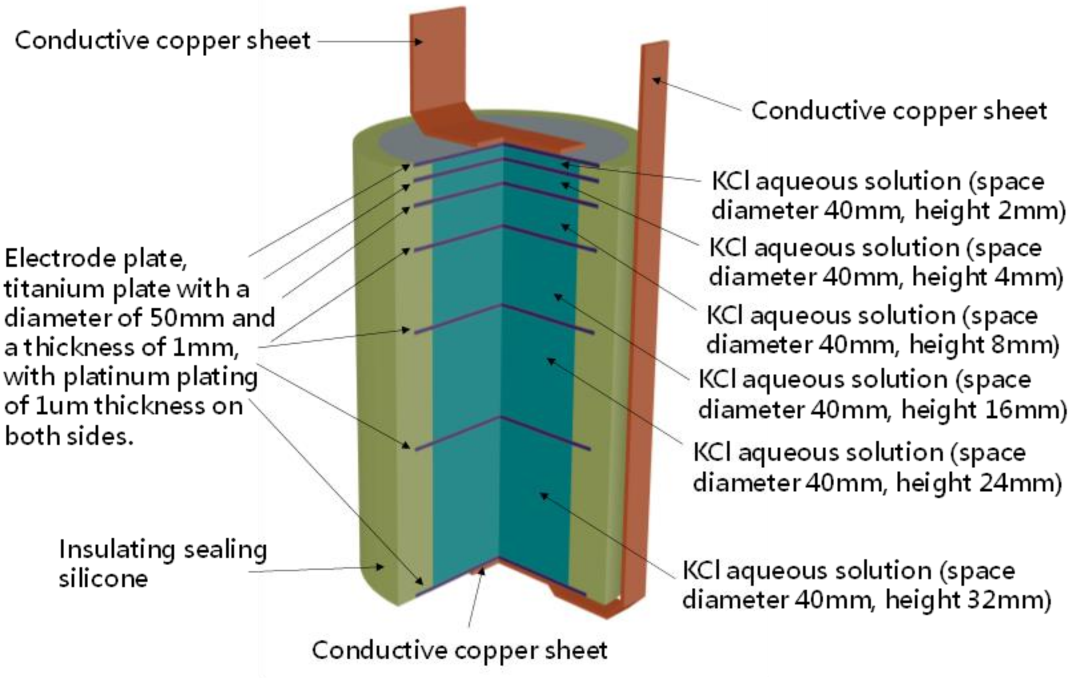
We propose that the thermal motion of ions—the microscopic chaotic vibrations caused by temperature—can sustain this voltage difference under the influence of gravity. In other words, rather than appearing momentarily and disappearing, this voltage and current could remain stable as long as thermal motion persists.

If this idea holds, it could challenge conventional assumptions about energy conversion. Could thermal vibrations be harnessed for electricity in a way never thought possible?



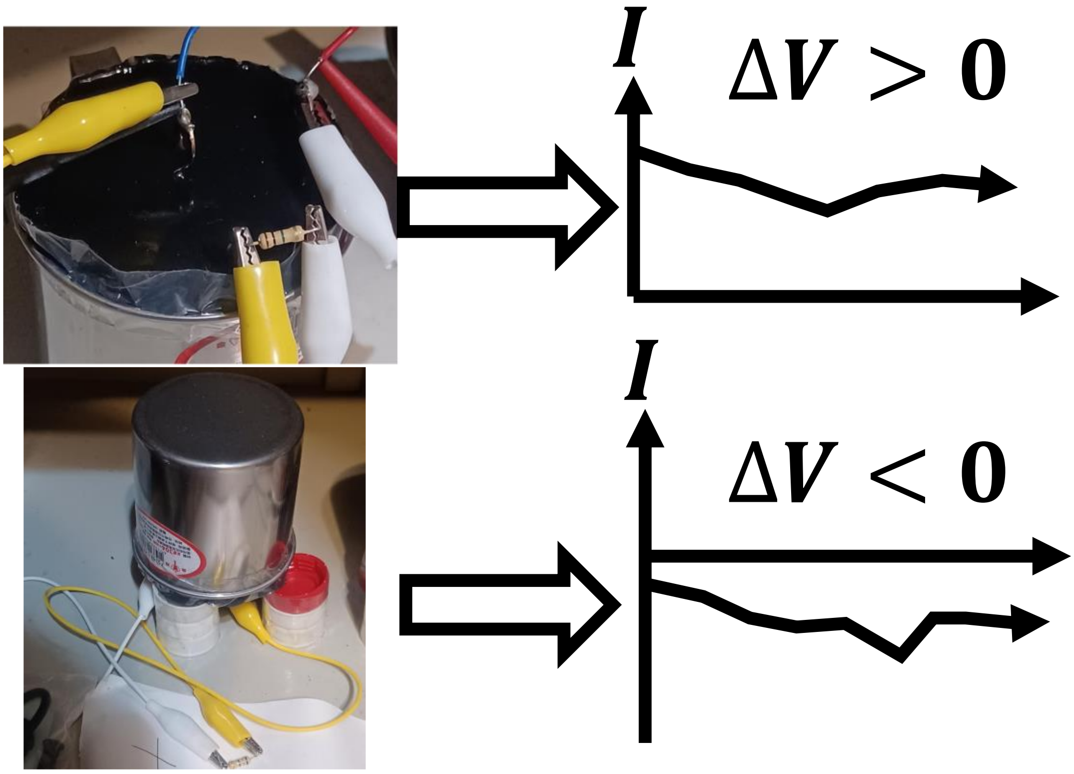
To prove this point, we conducted a three-month-long experiment.
We replaced potassium iodide with potassium chloride and used a copper wire instead of lithium iodide. First, we placed them in a centrifuge and observed that both the potassium chloride solution and the copper wire developed different voltage distributions. Next, we arranged them vertically, electrically connecting their bottom ends, and monitored whether a stable voltage would appear at the upper ends. The results were clear: over the course of three months, the voltage remained stable and consistently generated a steady electrical current.





The most crucial finding came when we inverted the entire setup—flipping it upside down. The voltage direction also reversed, proving that gravity was responsible for the phenomenon. Remarkably, both the current and voltage remained stable for more than three months.

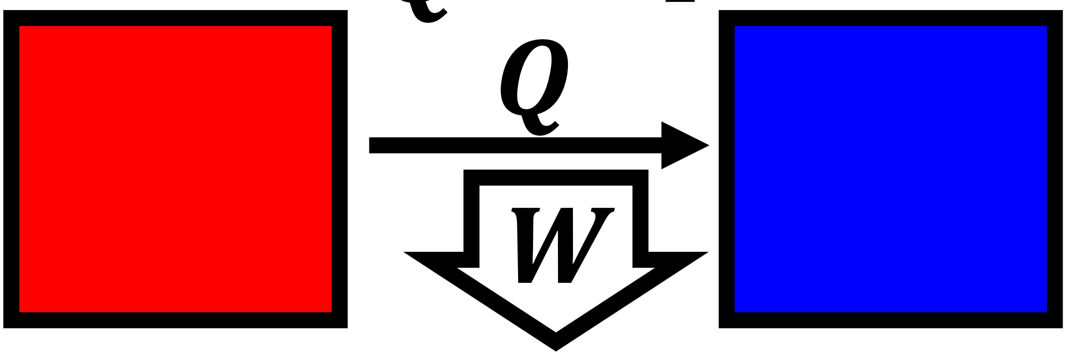
This indicates that the effect is not merely a chemical reaction. There were no changes in concentration distribution that could have led to potential energy shifts. Instead, this stability arises from a dynamic equilibrium between gravity and the thermal motion of ions.



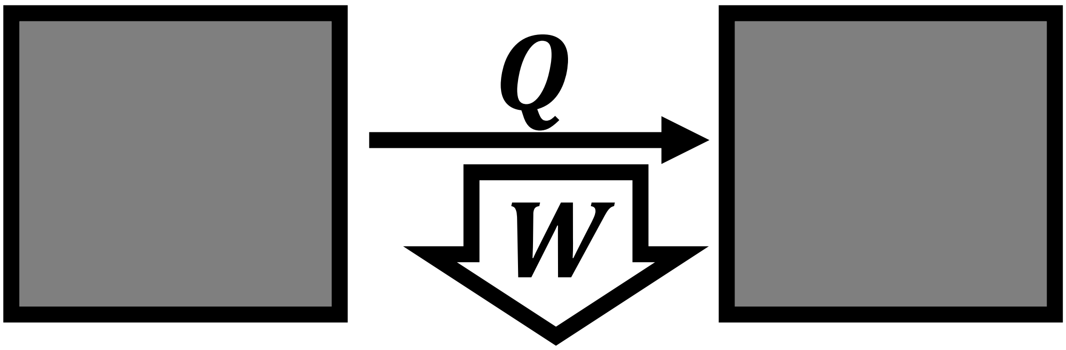
Why is this an exception to Carnot’s theorem?
Carnot’s theorem is a fundamental principle in thermodynamics and energy science. It states that the maximum efficiency of any heat engine is always limited by the temperature difference divided by the absolute temperature. In other words, if both ends of a heat engine are at the same temperature—meaning there is no temperature difference—it cannot generate any useful work, including electrical energy.

Carnot's theorem:

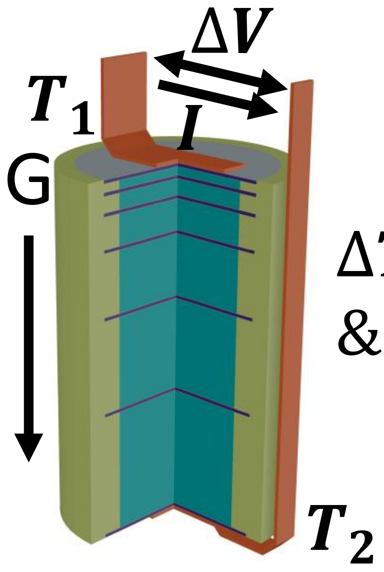
$$\frac{W}{Q} \leq \frac{\Delta T}{T}$$



$$\Delta T = 0 \Rightarrow W = 0$$



However, our system operates in a completely isothermal environment yet still produces stable electrical output. Since the energy comes from the thermal motion of ions, it essentially represents a process where heat energy is converted into electrical energy. The issue is that, according to Carnot's theorem, this should be impossible.



$$\Delta T = |T_1 - T_2| = 0,$$
$$\& \; P = I \cdot \Delta V > 0$$

Our explanation is that Carnot’s theorem has an overlooked exception under the influence of a gravitational field. Just as Newtonian mechanics needs adjustments when approaching the speed of light—but remains valid in most cases—we are not claiming Carnot’s theorem is incorrect. Rather, we suggest that an exception arises within accelerated force fields, such as gravity or centrifugal forces.

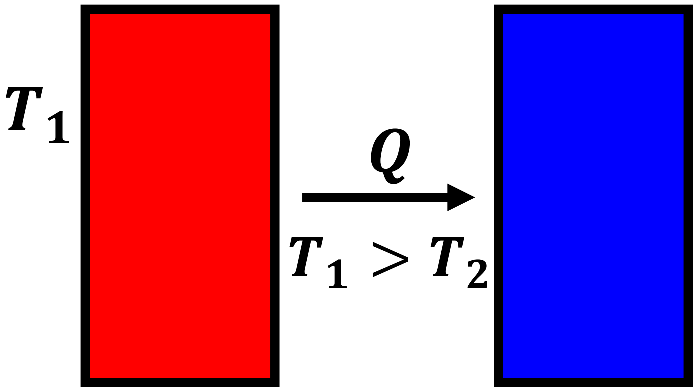
Does entropy always increase?

The second law of thermodynamics states that the entropy—essentially the disorder of a system—always increases. Many scientists interpret this as the reason why time only moves forward. But if our system allows heat to flow from a lower-temperature region to a higher-temperature one, that would mean entropy is decreasing instead of increasing.

Second Law of Thermodynamics:

$$\Delta S \geq 0$$

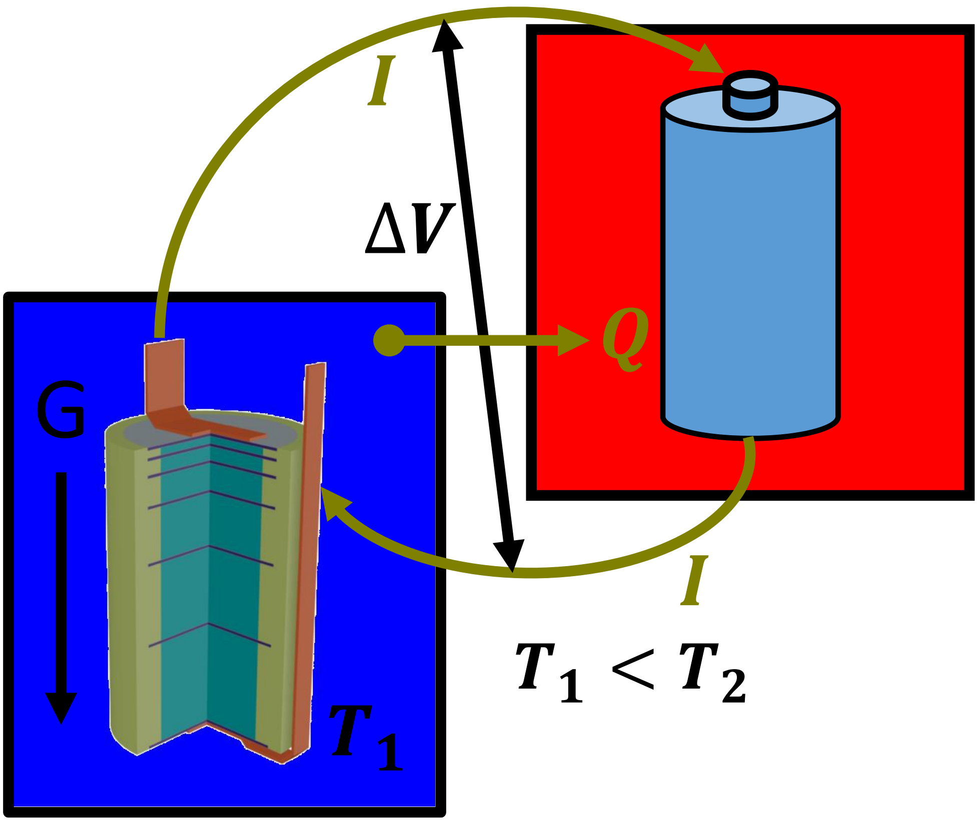
$$\Delta S = \frac{Q}{T_2} - \frac{Q}{T_1} = Q\frac{T_1 - T_2}{T_1 T_2} > 0$$



By definition, entropy is given by ΔS = Q / T. When no external work is applied, energy naturally flows from a hotter object to a colder one. Since the hotter object has a higher temperature, its entropy increase (ΔS) is smaller due to the larger denominator. Meanwhile, the colder object has a lower temperature, making its entropy increase larger due to the smaller denominator. The result is a net increase in total entropy.

How does energy flow from a lower-temperature region to a higher-temperature one?

Imagine connecting our electrically active electrolyte system—one that can generate stable electrical energy—to a rechargeable battery at a higher temperature. Whether the battery can be charged depends on voltage, not temperature. Therefore, the electrical energy produced by the lower-temperature electrolyte can still be absorbed by the higher-temperature battery.



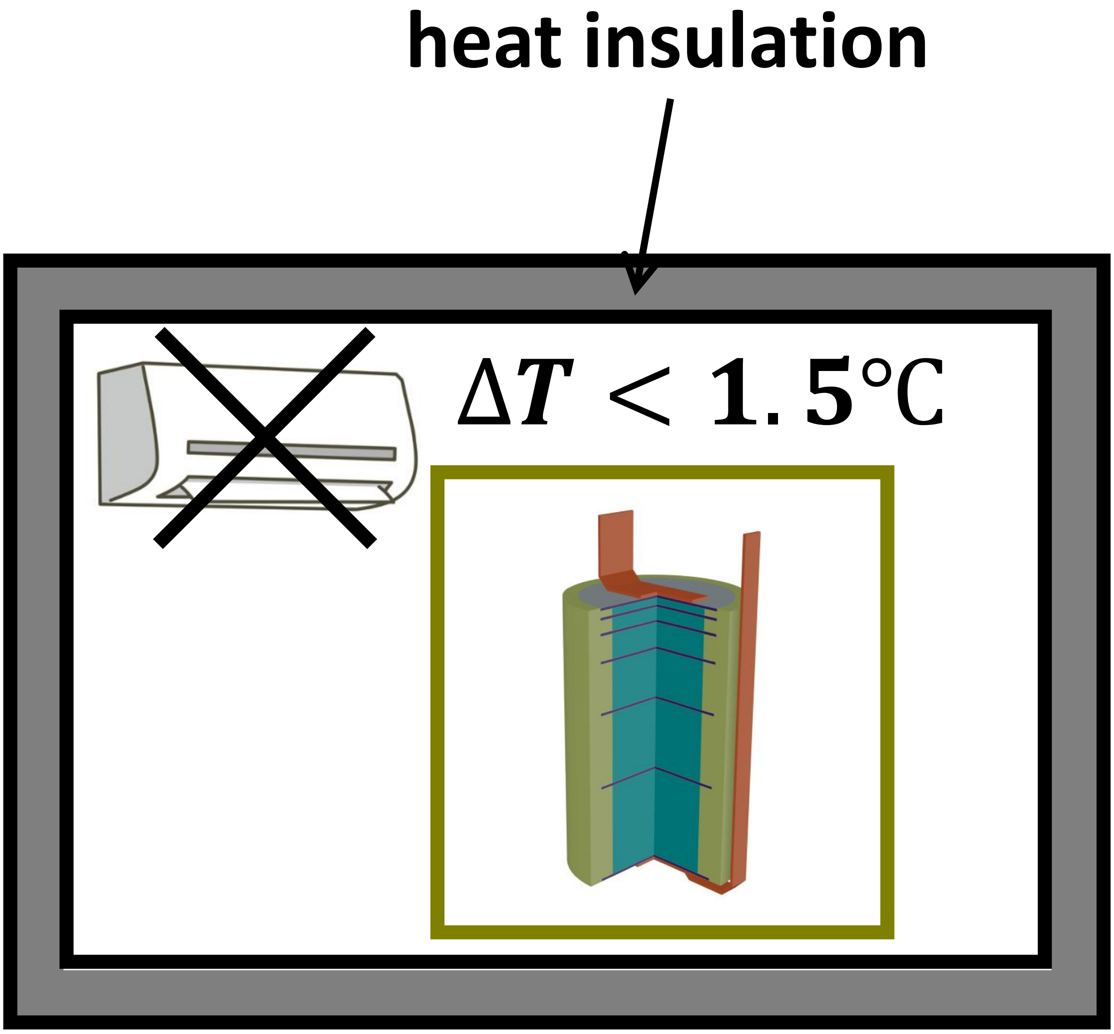
Now, let’s revisit the definition of entropy: ΔS = Q / T. Since the electrolyte has a lower temperature, its denominator is smaller, meaning its entropy output is larger. Meanwhile, the battery has a higher temperature, so its denominator is larger, meaning its entropy input is smaller. The result? A net decrease in total entropy.

The same outcome occurs if we replace the battery with a resistor. As long as the resistor is positioned at the higher-temperature end, the entropy reduction still holds.

According to traditional thermodynamics, this kind of process is not supposed to happen. Yet, under the influence of gravity, we have observed precisely this phenomenon. This suggests that the common idea of entropy as the "arrow of time" may be misleading—because we are witnessing a scenario where time moves forward, yet entropy decreases.

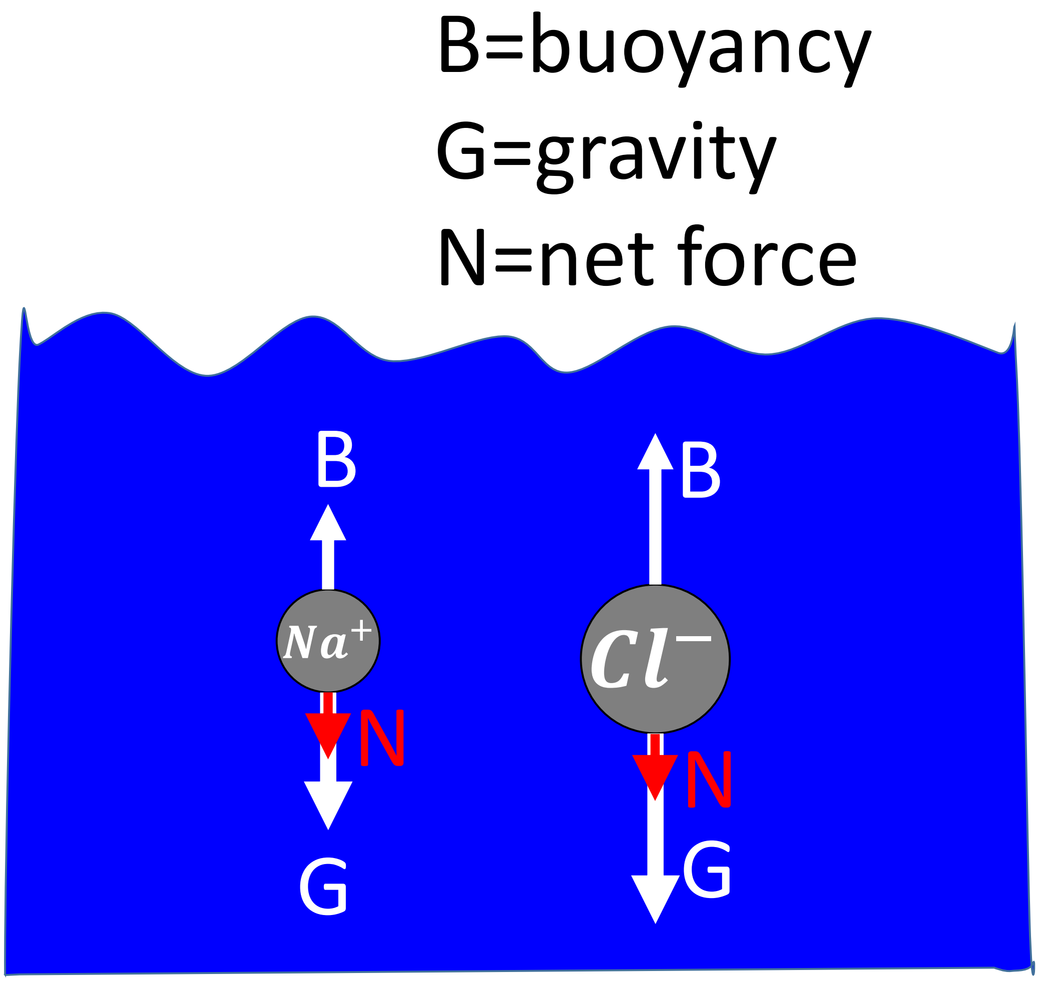
Why hasn't anyone discovered this before?

Many people wonder: Why has this exception gone unnoticed for over a century? The reason is actually quite simple—Earth's gravity is too weak, making it incredibly difficult to measure. Even the slightest temperature variation in the environment can cause convection in the electrolyte, disrupting the voltage difference created by gravity. To detect this effect, we conducted our experiment in an environment where the maximum daily temperature fluctuation was less than 1.5°C. We couldn’t use air conditioning or allow airflow disturbances. Additionally, we placed the samples inside an iron cabinet to shield them from electromagnetic interference. Only under these strictly controlled conditions were we able to consistently measure such faint voltage and current signals.



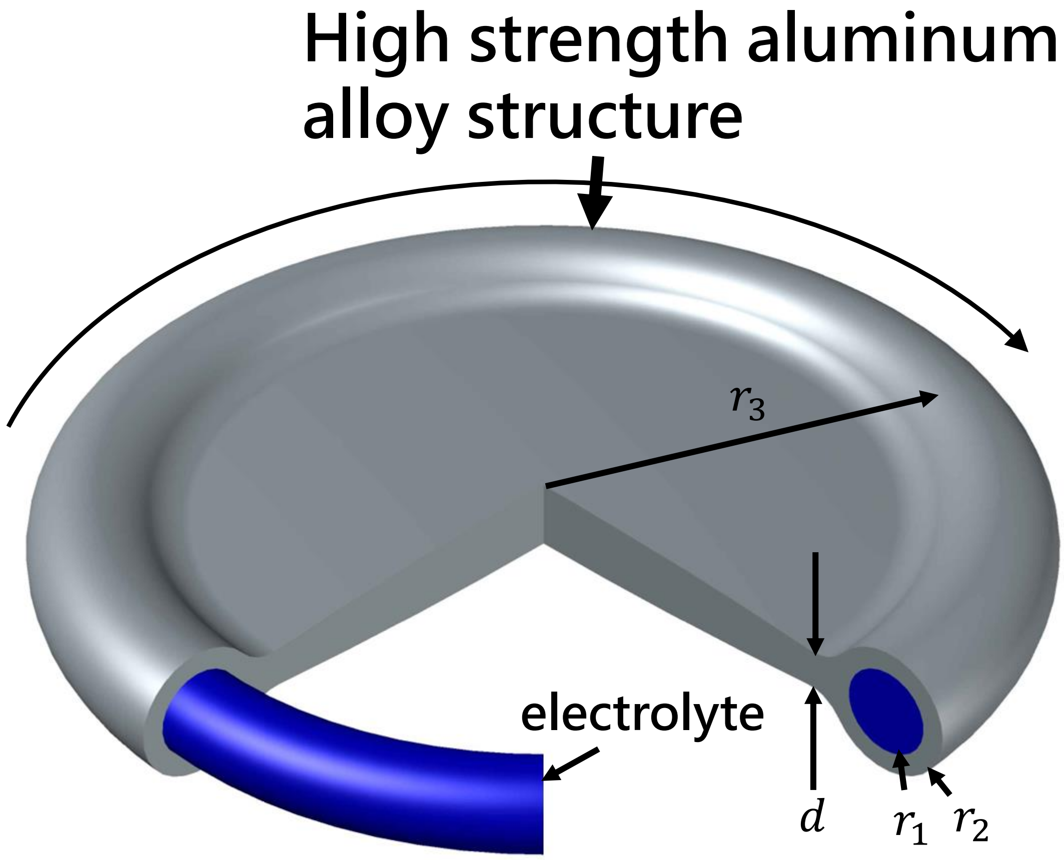
Some asked: If this effect exists, why haven't we detected it in the ocean, which is essentially a vast electrolyte under gravity?
One major reason, as mentioned earlier, is that temperature differences cause convection, and water currents further disrupt any stable charge separation. But there's another key factor: While chloride ions (Cl^-) in seawater are much heavier than sodium ions (Na^+), chloride ions are also significantly larger in volume, which means they experience greater buoyant force in water. After accounting for buoyancy, the effective mass difference between sodium and chloride ions becomes much smaller, reducing the gravitational separation effect. As a result, the ocean

does not exhibit a noticeable voltage difference, making this phenomenon difficult to observe in natural conditions.



How could this change the world?

We can enhance this effect using centrifugal force. When the rotational speed doubles, the centrifugal force increases fourfold, and the voltage difference follows suit. If the output resistance remains unchanged, the resulting power output increases by four squared—sixteen times. According to our calculations, under conditions that existing materials can withstand, a one-cubic-meter system could reliably generate over 72 watts of electrical power. By further applying the Nernst equation, adjusting the pH level, and optimizing the voltage difference, the energy output could be even greater.



This is a fuel-free, pollution-free, and even temperature-difference-free form of green energy. Since the energy comes from gravity and the thermal motion of ions, in theory, as long as Earth retains its temperature, this energy source will never stop.
Conclusion: We have found that this exception truly exists.
We are not trying to overturn the second law of thermodynamics. We are simply saying that, just as Newtonian mechanics requires adjustments near the speed of light, the second law of thermodynamics may also have exceptions under certain special conditions.
If you are an expert in physics, chemistry, or energy conversion, we sincerely invite you to help us identify any flaws in our reasoning. If you are a general reader, we hope you can see that—in this universe governed by strict physical laws—there may still be undiscovered possibilities. These possibilities could change the rules of energy as we know them and potentially offer a way to combat global warming.

For the sake of our planet, and to accelerate global technological progress, please share this video and help spread the word!

Videos:

Could an exception to the second law of thermodynamics rewrite the world's energy rules? https://youtu.be/NA_FsBknLV0
一個熱力學第二定律的例外，會改寫全世界的能源規則嗎？有可能逆轉全球暖化危機嗎？ https://youtu.be/15ZkKmwHXMw