Nuclear-powered BV100

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China has recently created a **nuclear-powered battery**, the **BV100** that has a long lifespan and robust performance.

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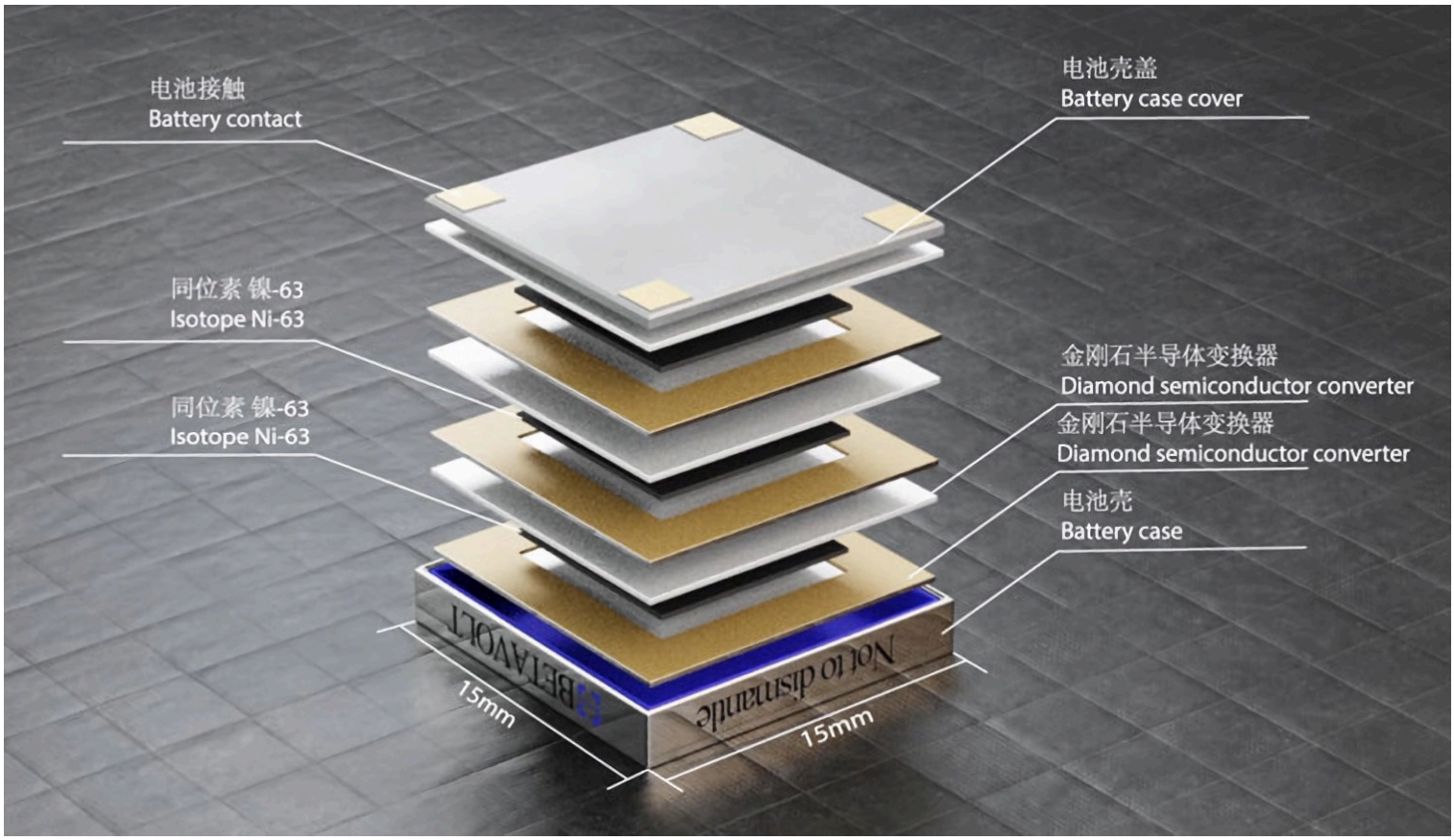
About the Nuclear-powered BV100:

- The Nuclear-powered BV100 has a **50-year lifespan** that does **not** require **recharge**.
- It can operate safely under **extreme temperatures** and are resistant to physical damage.
- It is classified as **betavoltaic**.
    - **Betavoltaic** battery is a form of nuclear technology that utilizes the decay energy of **?-emitting radioisotopes** to produce electrical power.
- It generates an **electric current** directly from **beta particles** (**electrons**), using semiconductor junctions, emitted from a **radioactive source**.

Features:

- It harnesses energy from **nuclear decay** of **nuclear isotopes**, specifically from **nickel-63**.
- It employs a unique **single-crystal diamond** semiconductor for energy conversion.
- It can achieve an **8.8% energy** conversion efficiency.
- It is based on **isotope** technology first proposed in **1913**.



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Working mechanism:

- Unlike **nuclear fission** or **fusion**, **nuclear decay** is a spontaneous process in which **isotopes** emit **radiation**, leading to **more stable new atoms**.
- Scientists encapsulate these isotopes, and converts the energy emitted into **usable electrical power**.
- The BV100 uses a modular structure, as it sandwiches a **nickel-63 layer** between 2 thick diamond semiconductors, forming a **power-generating unit**.
- The **beta particles** released during the **decay** of **nickel-63** are **irradiated** on the **diamond semiconductor** to form an electric field and achieve electrical energy output when connected to the circuit.

Benefits and Applications:

- It is designed to be **safe** and **stable**, posing **minimal pollution** threat.
- Integrating **multi-stage batteries** often leads to **efficiency losses**, and hence utilisation of Nuclear-powered BV100 can be beneficial.
- It has potential to **power devices** like **smartphones** and **drones** indefinitely.
- It can be used in continuous operation of **military drones** and **deep-sea monitoring devices**.
- It can also be used in submarine navigation beacons, heart pacemakers, among others.

Challenges:

- There are concerns like **nuclear safety**, **radiation** protection, and **efficiency** losses.
- It will increase dependency on **imported isotopes** for manufacturing.