

Thermally Dissipative Electrochemical Cell

Patent #10,164,304

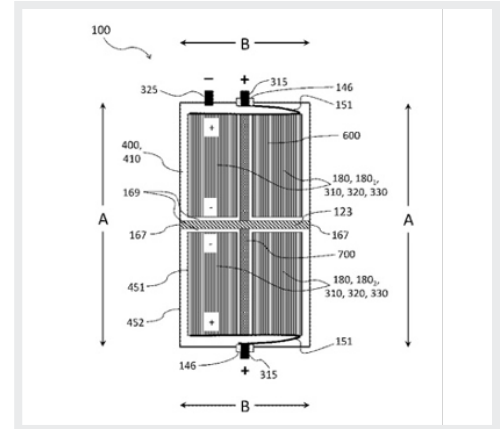
GROW • IMPROVE • LEARN • NETWORK



Helping Manufacturers Grow Profitably Since 1988

Patent Overview

Thermally Dissipative Electrochemical Cell – Patent # 10,164,304



Key Features

- The Thermally Dissipative Electrochemical Cell improves heat dissipation.
- The invention includes at least one thermally conductive plate, at least two electrode components, and a casing.
- The casing is categorized by a cell length.
- Each thermally conductive plate is perpendicular to the cell length, interposed between two electrode components, electrically conductive and electrically connected to the two electrode components between while the thermally conductive plate is interposed.
- Compared to other approaches, the invention has greater success in keeping a cell in good thermal communication with the surrounding environment.
- The invention improves safety and reliability of a cell and makes thermal management of the cell less challenging.

Technical Information

- Conventional secondary electrochemical (Lithium-ion) cell device includes electrode assembly, battery case, end caps, electrolyte, and mandrel.
- The electrode assembly includes an anode, insulating separator, cathode, positive electrode tab, negative electrode tab, first insulator layer, and second insulator layer.
- The anode layer, insulating separator layer, and cathode layer are rolled up together to form the electrode jellyroll.
- The battery case includes a side wall and bottom wall, and is made of an electrically conductive material, such as metal.

Potential Markets

This section provides insights into market size, trends, and barriers to entry for commercial applications of the technology, as well as recommendations for deeper market research. Potential markets include Electric Motor Manufacturing, Power Generation, Battery industry, and Electric Vehicles. The fastest growing market is the global Electric Vehicle market with a Compound Annual Growth Rate (CAGR) of 18.2% until 2030.

Potential Markets

Market Insights

Electric Motor Manufacturing

All motors related to converting electrical energy to mechanical energy.

Market Size/Trends

- The global Electric Motor market was valued at US \$113 billion in 2021 and is projected to reach \$181.9 billion by 2028 (a CAGR of 7.0% during the period).
- The global market exhibited a growth rate of -9.6% in 2020; the sudden, predicted rise in CAGR is attributed to the demand and growth returning to pre-pandemic levels.
- Increasing adoption of electrical devices and machines in the industrial and automobile sectors will promote market growth.
- Increasing adoption for HVAC applications will propel market growth through the demand and deployment of electric motors.

Barriers to Entry – High:

- Electric motors entail high maintenance (and sometimes operating) costs.

Power Generation

All forms of energy consumption related to generating electricity.

Market Size/Trends

- The global Power Generation market was estimated at \$1,800 billion in 2022 and is expected to reach \$3,900 billion by 2032 (a CAGR of 8% between 2023 and 2032).
- Electricity demand is expected to increase along with household incomes, driven by an increased rate of electrification of transportation and heat, and surging demand for digitally connected devices and air conditioners.
- The Power Generation market has experienced great demand due to increasing population, rapid urbanization, and other factors.

Barriers to Entry – High:

- Existing generation equipment and systems rely on aging infrastructure, which struggles to meet the growing demand for electricity.
- Declining investment in the power sector is the most significant challenge to market growth.

Potential Markets (continued)

Potential Markets

Market Insights

Battery industry

A source of electric power consisting of one or more electrochemical cells.

Market Size/Trends

- The global Battery market size was valued at \$104 billion in 2022 with an expected CAGR of 15.8% from 2023 to 2030.
- The high use of uninterruptible power supply (UPS) devices in the healthcare, chemical, and oil and gas sectors is expected to propel the growth of the battery market.
- Lithium-ion batteries are expected to capture a significant portion of the market due to favorable government policies and increasing electric vehicle and consumer electronics sales.
- There is a growing number of battery manufacturers in the US.

Barriers to Entry – High:

- Constraints exist on the ability to obtain lithium, nickel, and other materials needed to make batteries.

Electric Vehicles

Vehicles that can be powered by an electric motor that draws electricity from a battery

Market Size/Trends

- The global Electric Vehicle (EV) market was estimated to be \$163 billion in 2020, and is projected to reach \$823 billion by 2030, demonstrating a CAGR of 18.2% from 2021 to 2030.
- Electric vehicles convert more than 50% of the electrical energy from the grid to power at the wheels, whereas the gas-powered vehicles only manage to convert about 17%–21% of the energy stored in gasoline.
- The demand for fuel-efficient vehicles has increased recently due to rising fuel costs.
- EVs outperform conventional vehicles, providing higher fuel economy, low carbon emission and maintenance, the convenience of charging at home, enhanced ride comfort, high performance, and reduced engine noise.

Barriers to Entry – High:

- Lack of charging infrastructure, high manufacturing costs, and range anxiety and serviceability are the factors expected to hamper growth of the EV market.

NAVSEA

**Liberty
Tech
Bridge**

DVIRC

The result of an innovative partnership between the Naval Surface Warfare Center Philadelphia Division (NSWCPCPD) and the Delaware Valley Industrial Resource Center (DVIRC), Liberty Tech Bridge seeks to strengthen ties between the region's defense and industrial sectors. Together, NSWCPCPD and DVIRC are accelerating and expanding competitiveness among America's warfighters.



2905 Southampton Road
Philadelphia, PA 19154

215-464-8550
info@dvirc.org
www.dvirc.org



/DVIRC_PA



/dvirc.sepa



/company/dvirc/



/user/dvirc