High-capacity Li-ion Energy Storage Device for Disposable Medical Capsule

Micro-nano structured Si/C composite anode design encapsulates nano-size Si aggregate into micro-size C-based conglomerate, enhances the specific capacity of the anode of Li-ion energy storage device for disposable medical capsule application.

Keywords:
- Disposable medical capsule, energy density, high-capacity, lithium-ion, micro, nano, silicon, carbon, energy storge device, environmental-friendly.

Problems addressed

Rising disposable medical capsule applications seek for higher power and/or energy density requirement against existing applications. Thus drives the implementation and development of high-capacity rechargeable lithium-ion energy storage technology.

ASTRI's design employed micro-nano structured silicon/carbon composite which aids to nearly double the anode specific capacity (700 vs 370 mAh/g) of Li-ion energy storage device for disposable medical capsule applications.

Innovations

The innovative micro-nano structured Si/C composite anode design encapsulates nano-size Si aggregate into micro-size C-based conglomerate, markedly boosted anode specific capacity. The technology is applicable for the advancing disposable medical capsule applications.

Key features include:

- **Nano-size Si** aggregate provides **fast Li ions diffusion** pathways
- **Micro-size C-based conglomerate** accommodates volumetric expansion of Si and maintains the integrity of anode
- **Environmental-friendly** and **low-cost process**

Key impact

- **Pain relief** and **easy to swallow** due to reduced size
- High capacity enables **high resolution imaging**
- Supports pre-tune of medical device and **achieves high accuracy**

Innovation snapshot

Specific Capacity (mAh/g)

~2X capacity for low cycles applications

700 mAh/g
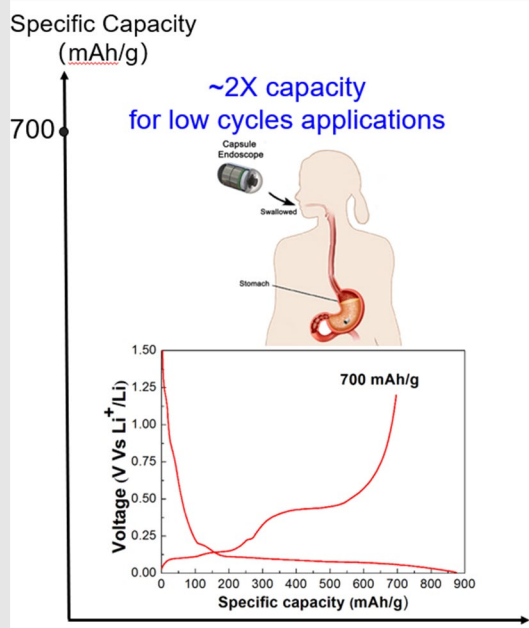
Project completed
- 2019

Applications
- Disposable medical capsule

Patent(s)
- US Patent No. 10,608,226

ASTRI Patent Search

Commercialisation Opportunities
- IP licensing
- Technology co-development