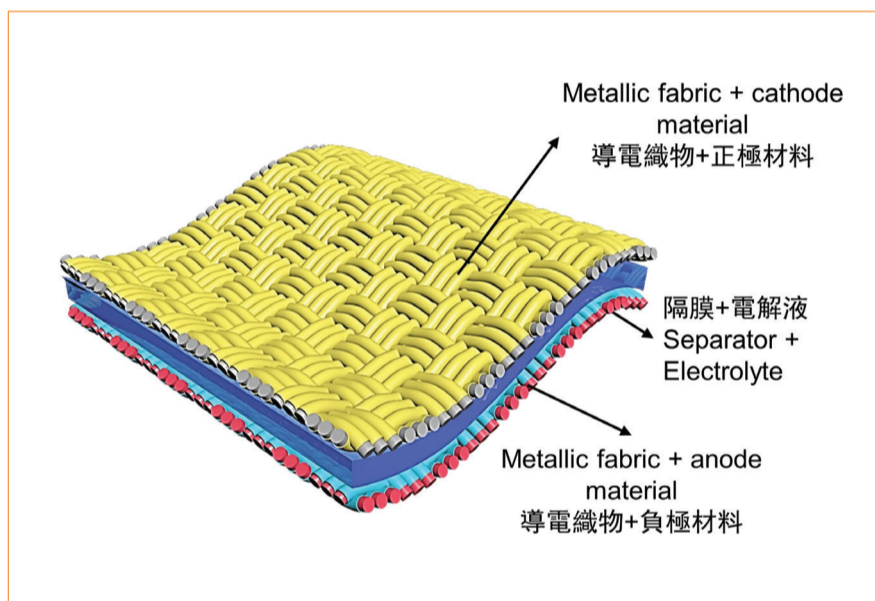


高能量密度柔性織物鋰電池 Flexible, Stable, High-energy Textile Lithium Batteries

適用於可穿戴電子設備的高性能柔性鋰電池
High-performance flexible lithium batteries for powering wearable electronics

專利申請編號: 62/599,815 (美國)

可彎曲及可穿戴的裝置無疑是電子設備的未來趨勢，但目前在裝置的電源方面仍有不少限制。因此，我們利用導電織物開發了可穿戴柔性鋰電池。這些新型柔性鋰電池可以承受複雜和惡劣的穿戴狀況，例如反覆摺疊和扭曲等。它們同時擁有高能量密度、良好的循環穩定性（500次充放電循環後電池容量剩餘>80%），以及優異的耐彎折性能（彎折半徑<1mm），且已通過穿刺與擠壓試驗，是非常可靠和安全的電源選擇。該柔性織物鋰電池可為便攜或可穿戴電子設備、可彎曲電子設備及物聯網器件等裝置提供能量。



柔性織物鋰電池的結構
Configuration of the flexible textile lithium battery

Although flexible and wearable gadgets are the next major trend in electronics, limitations on the power source have yet to be overcome. Hence, a new type of flexible lithium batteries has been developed by using metallic textiles. These flexible batteries can withstand complex and harsh wear conditions, e.g. repeated folding and twisting. They have achieved a high energy density, excellent cyclic stability (>80% capacity retention after 500 cycles) and remarkable bending stability at small bending radius (<1 mm). Proved to be penetration and impact safe, they are highly reliable and safe to use. Flexible textile lithium batteries can be potentially used to power portable or wearable electronics, flexible electronics, components of Internet of Things (IoT), medical accessories, etc.

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特色與優點

- 優異的儲能性能 (>450瓦時/升)
- 超高的機械穩定性
- 良好的安全性
- 其製備過程與傳統紡織品及電池的生產程序完全兼容

應用

- 便攜式/可穿戴電子設備，如柔性屏幕、智能手錶/手環、智能卡
- 智能電子紡織品，如發熱衣、智能鞋墊
- 物聯網器件，如健康監測傳感器
- 醫療配件，如心電掃描器、壓力傳感器

獎項

- 第47屆瑞士日內瓦國際發明展 - 金獎 (2019年4月)
- 羅馬尼亞科學研究院優異獎 (2019年4月)
- 羅馬尼亞錫比烏協會優異獎 (2019年4月)



電池性能
Battery Performance

Patent Application No. and Country: 62/599,815 (US)

Special Features and Advantages

- High energy-storage performance (>450 Wh/L)
- Superior mechanical stability
- High cell operational safety
- The fabrication processes were fully compatible with the roll-to-roll manufacturing of textile materials and the production of conventional batteries

Applications

- Portable/wearable electronics, e.g. flexible displays, smart watches/wrist bands, smart cards
- Intelligent electronic textiles, e.g. heating garments, smart insoles
- IoT components (IoT), e.g. health monitoring sensor
- Medical accessories, e.g. electrocardiogram, pressure sensors

Awards

- Gold Medal – 47th International Exhibition of Inventions of Geneva, Switzerland (Apr 2019)
- Special Merit Award from Academy of Technical Sciences of Romania (Apr 2019)
- Special Merit Award from Romanian Association for Alternative Technologies Sibiu, Romania (Apr 2019)



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