

# Zn-based Hybrid Batteries for Flexible Electronics

## 新一代用於便携式電子設備的複合型鋅-空氣電池

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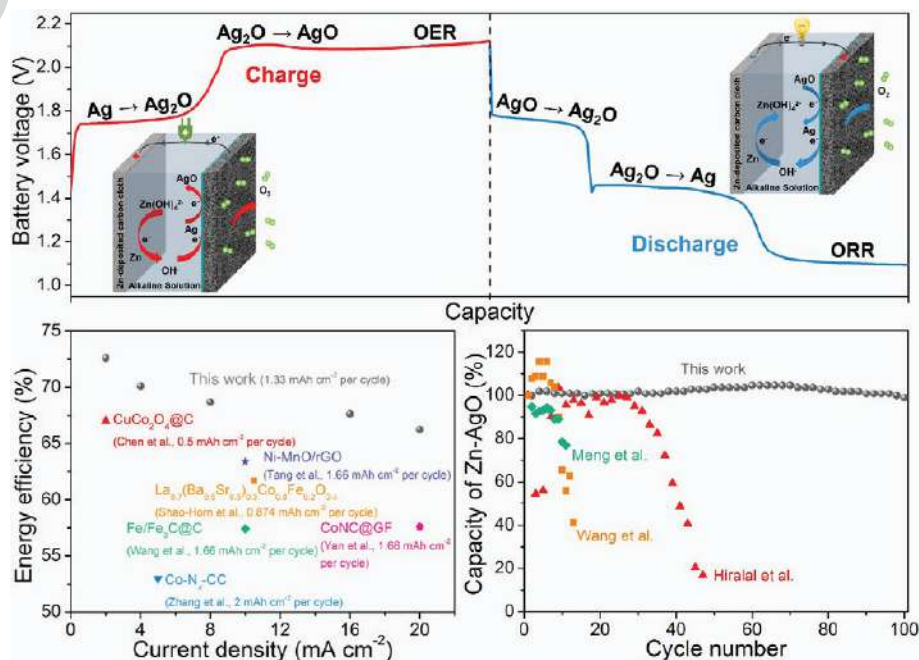
### Special features 技術特點

- ▶ Energy efficiency significantly improved from 60% (conventional) to 70%  
能源效率從現有的60%顯著提高到70%
- ▶ Discharge voltage increased from 1.2-1.4V (conventional) to >1.8V  
放電電壓從現有的1.2-1.4V增加到 >1.8V

Excellent cycling stability by minimizing Zn-dendrite formation  
減少鋅枝晶的形成，提高其循環穩定性

Existing Zn-air batteries show poor efficiency due to high charge voltage and low discharge voltage. We developed the new technology which perfectly integrates the advantages of both Zn-air batteries and Zn-metal batteries. By

developing nanostructured Zn-electrode and Ag-RuO<sub>2</sub>/carbon nanotube air electrode or Co<sub>3</sub>O<sub>4</sub>/carbon cloth air electrode, it can successfully increase the discharge voltage and decrease the charge voltage, leading to higher efficiency (over 70%) and higher discharge voltage (>1.8V) than existing Zn-air batteries. In addition, the Zn-dendrite formation is significantly minimized, leading to excellent cycling stability. By replacing the liquid electrolyte by the gel electrolyte, we developed flexible Zn-air batteries for powering flexible electronics.



現有的鋅-空氣電池充電電壓較高及放電電壓較低，所以其效能較為遜色。理大團隊通過發展具有納米結構的鋅電極，以提高鋅-空氣電池的表面積並抑制鋅枝晶的形成，使其穩定性可以提高。通過發展銀和Co<sub>3</sub>O<sub>4</sub>為基礎的空氣電極，將金屬/金屬氧化物的氧化還原反應引入到電池的充/放電過程中，從而降低了充電電壓，提高了放電電壓，使電池具有比傳統鋅-空氣電池更高的放電電壓和能量轉換效率。此新式複合型鋅-空氣電池比鋰離子電池安全和便宜，可以為各種便携式電子設備提供電能，例如手提電話或電腦，電子錶，可穿戴感測器等。

This hybrid battery is more efficient, more durable, cheaper and safe for use and can have various applications, such as power sources for portable electronics (mobile phones, notebook, digital watches) and wearable sensors, etc.



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