

# UC Berkeley

## Energy Use in Buildings Enabling Technologies

### Title

Printable Energy Storage Devices

### Permalink

<https://escholarship.org/uc/item/0n7998j8>

### Authors

Ho, Christine  
Keist, Jay  
Evans, James  
[et al.](#)

### Publication Date

2009

# Printable Energy Storage Devices

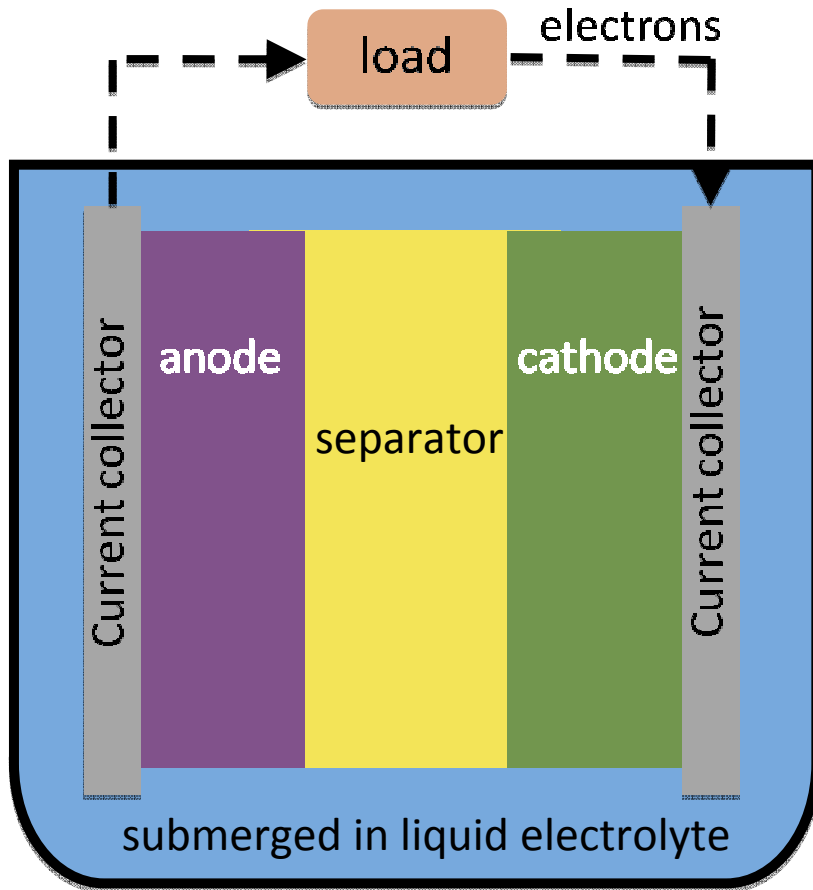
*We have developed a novel battery and electrochemical capacitor that are:*

- Paintable and Printable
  - Paper thin
- No liquid components

*Christine Ho, Jay Keist, BaQuan, Professor James Evans, Professor Paul Wright*

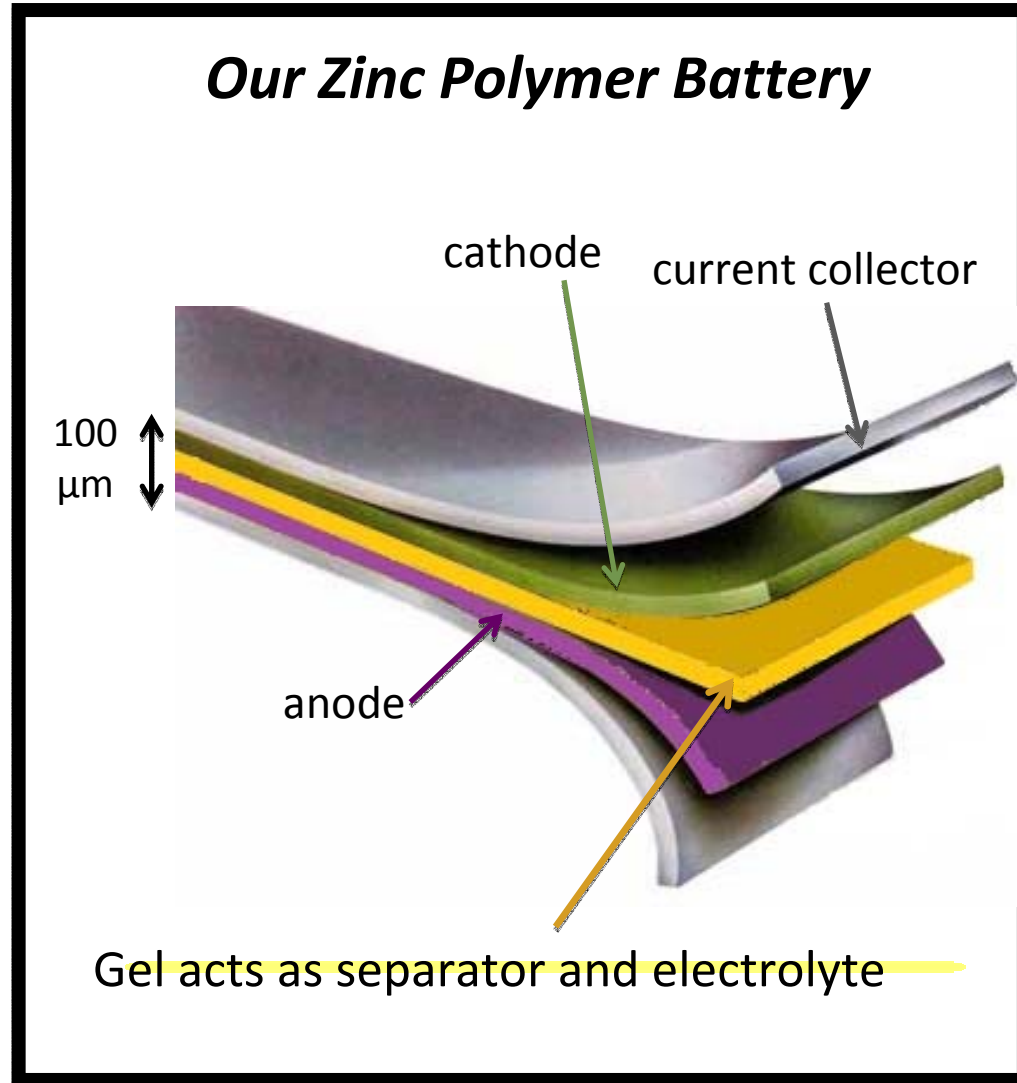
# Innovations in Energy Storage

**Generic Battery**



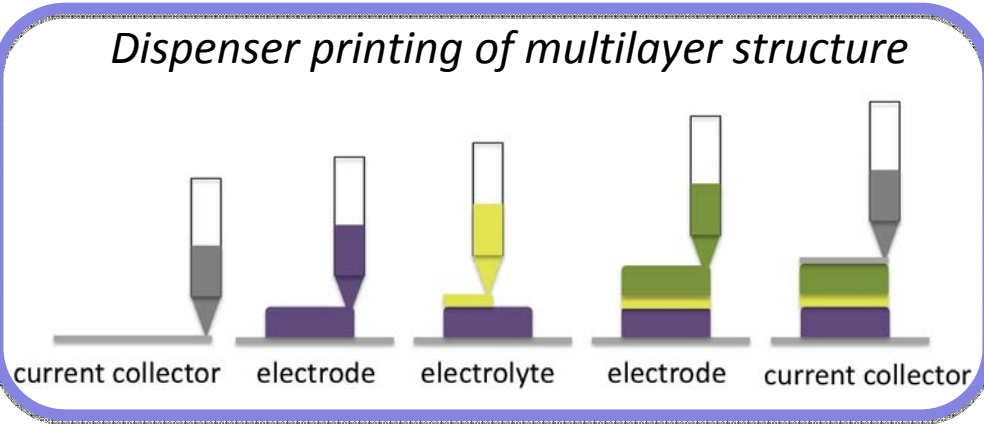
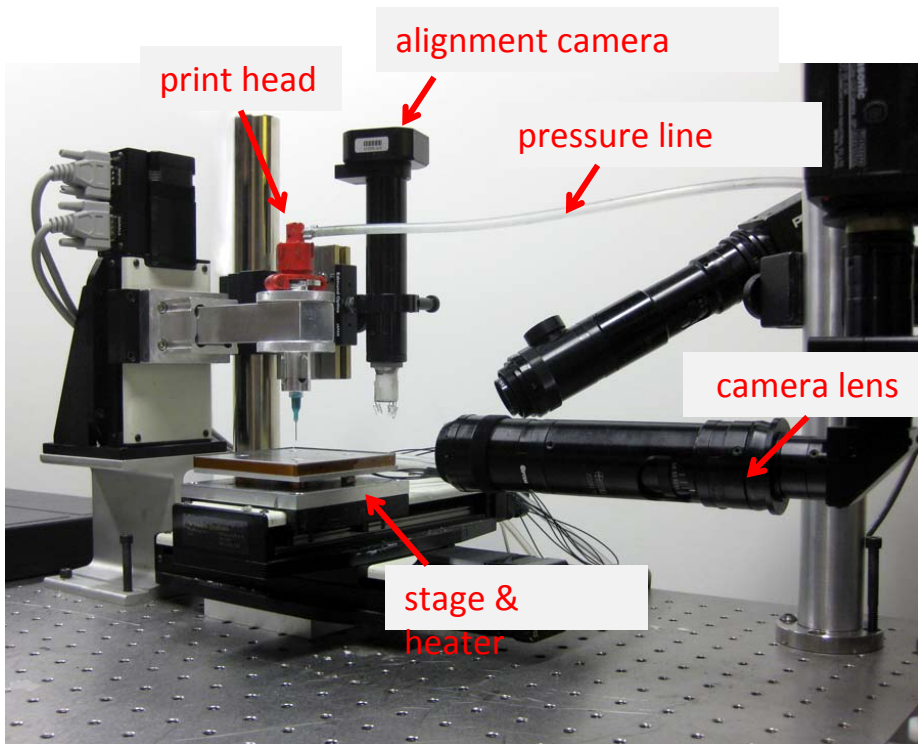
container seals in liquid

**Our Zinc Polymer Battery**

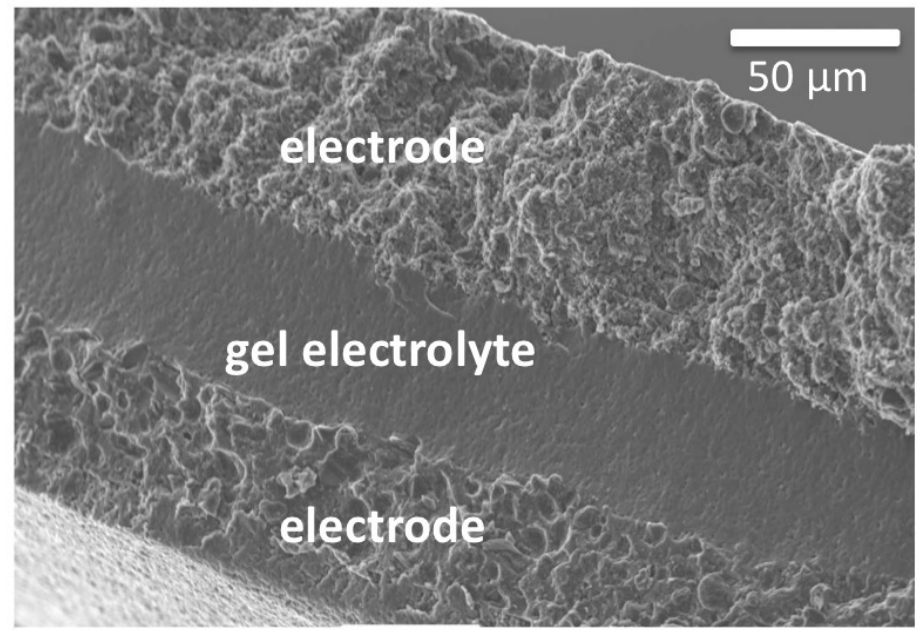


# Printing Energy Storage Devices

*Dispenser printer*

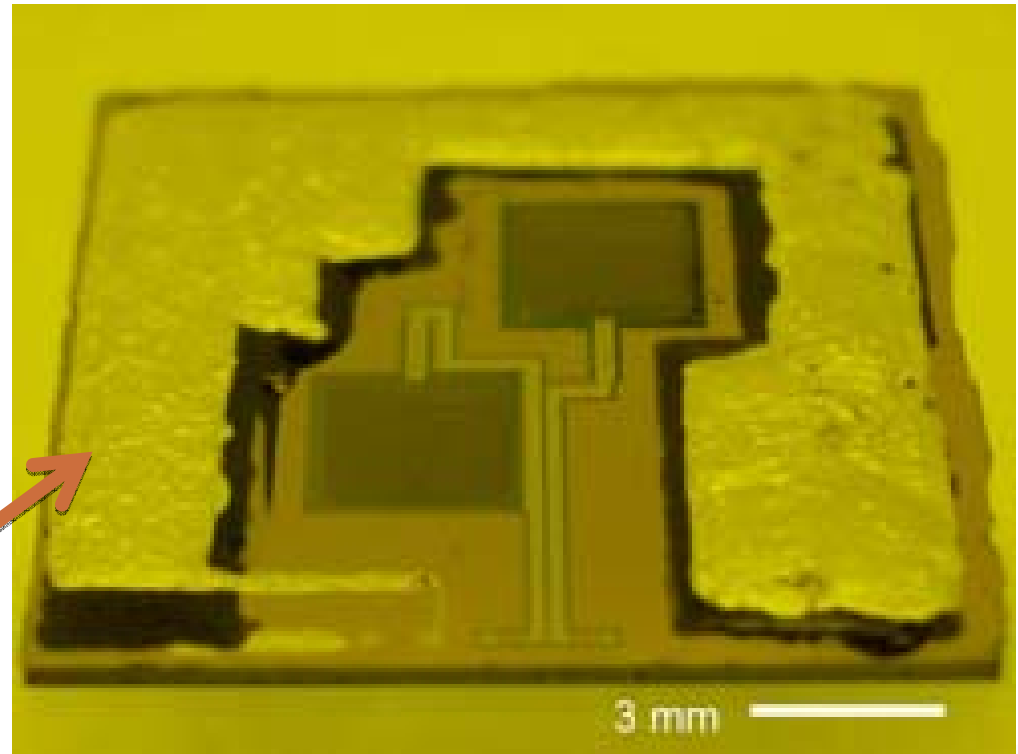


*Printed capacitor cross-section*



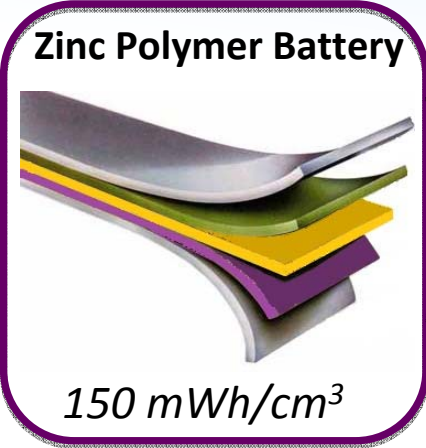
*Printed capacitors cycled > 120,000 times without performance degradation!*

# Integration of Micropower Components

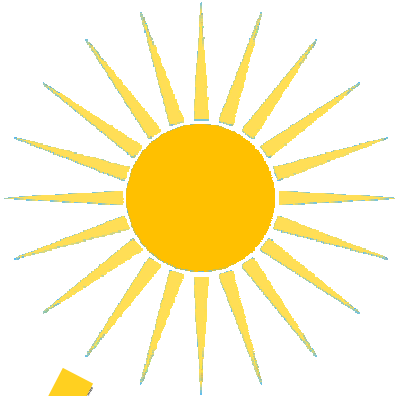


*Integrated vibration harvesters surrounded  
by a printed capacitor*

# Local Energy Storage in the Home



Prefabricated walls



~ 2,600 sq. ft



# Thin and flexible displays

*Thin, flexible displays need complimentary thin, flexible power source*



*e-reader*



*digital media refrigerator*

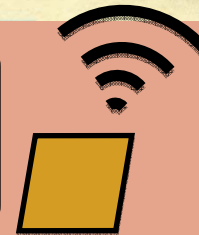
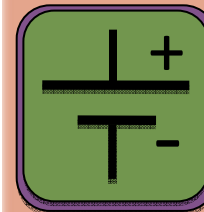


*smart labels*

## Printable Batteries



Battery deposition can be incorporated into the automated printing process line





# Printable Batteries



Battery deposition can be incorporated into the automated printing process line

Print media advertisement



# Printable Energy Storage Devices

*We have developed a novel battery and electrochemical capacitor that are:*

- Paintable and Printable
  - Paper thin
- No liquid components

*Christine Ho, Jay Keist, BaQuan, Professor James Evans, Professor Paul Wright*

*For more information, contact: [christine.c.ho@berkeley.edu](mailto:christine.c.ho@berkeley.edu)*