



BIOMIMICRY AND BATTERIES



Towards Structural and Systemic Design

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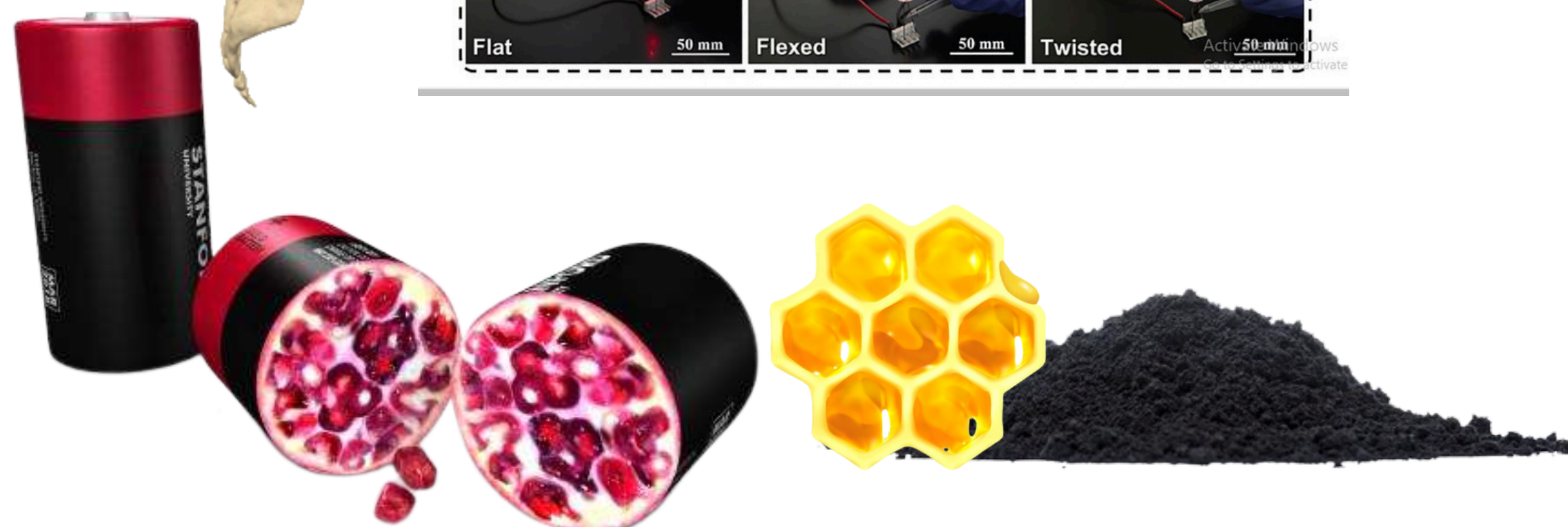
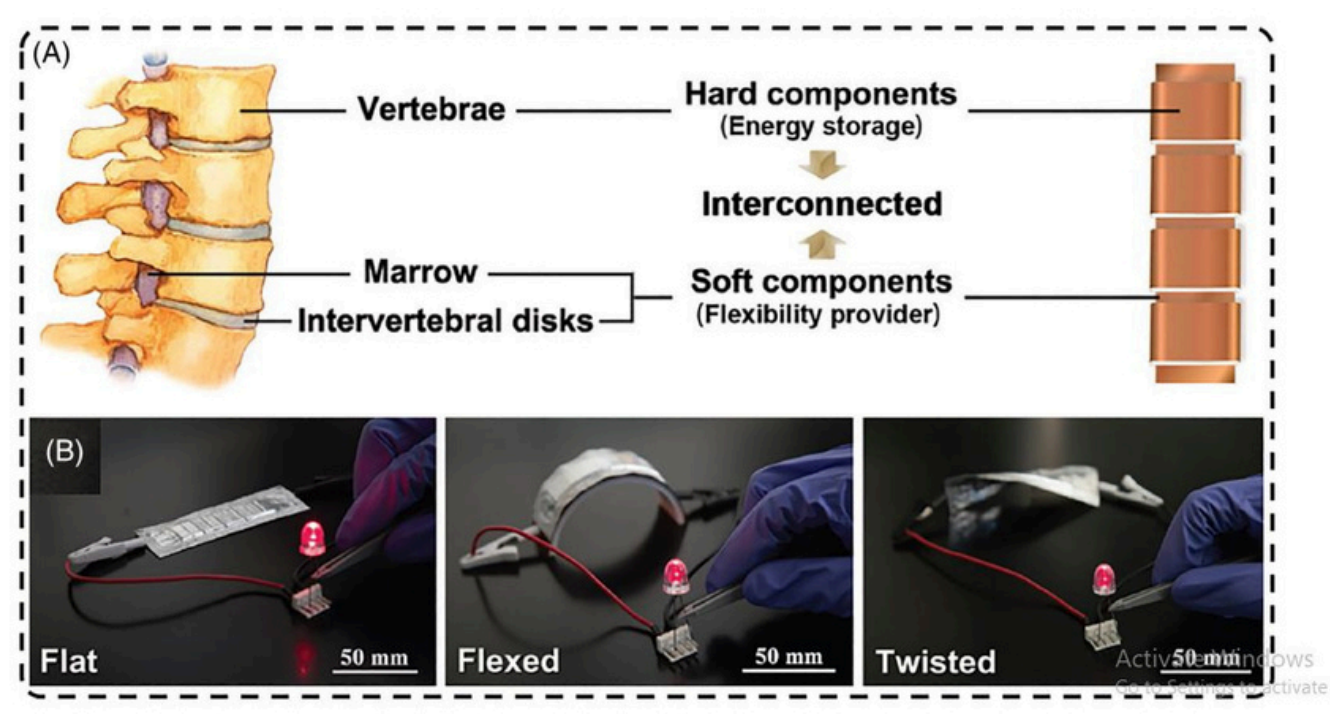
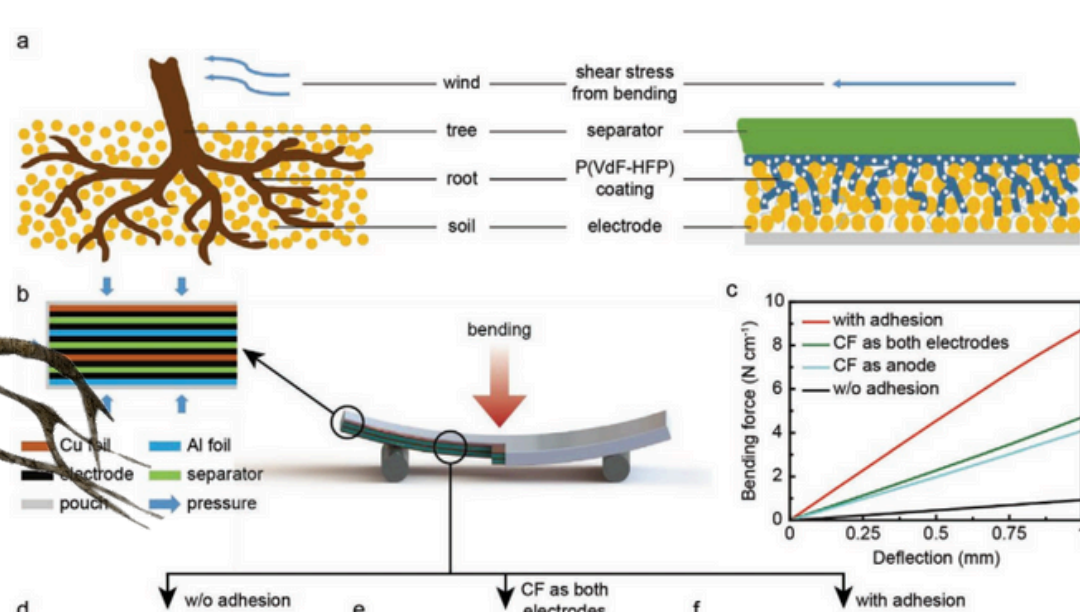
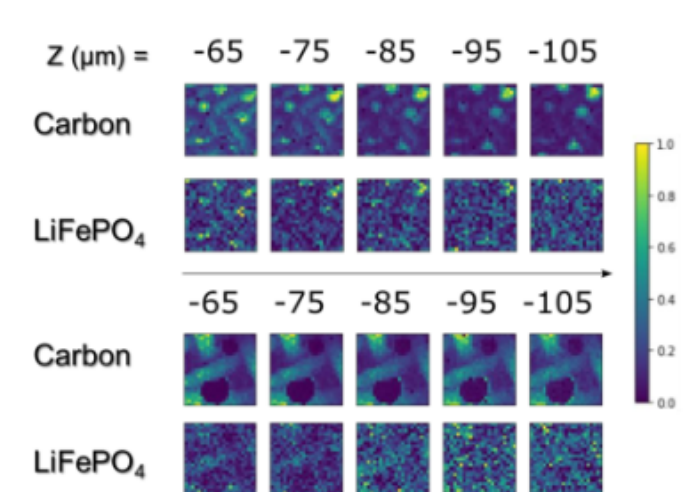
SCOPING

Descriptive review
Raw Material Extraction | Disposal | Recycling

FINDINGS

Conventional Material based chemistry-dominant energy storage industry

Current structure-mimicked co-creations:



PROPOSED APPROACH

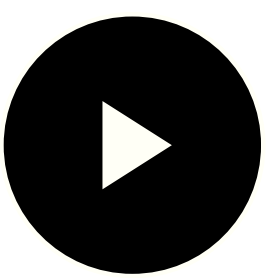
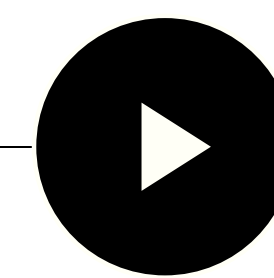
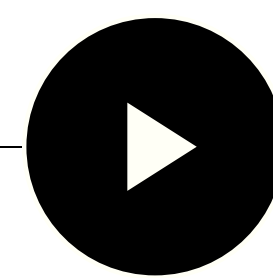
Repetitive Structures found in Nature

 HELICAL	 TEXTURE	 CELLULAR
 OVERLAP	 GRADIENT	 LAYER
 TUBULAR	 FIBROUS	 SUTURES

STRUCTURE

FUNCTION

MODEL



FABRICATION

EVOLUTION

RECYCLING

CHALLENGES

Adaptation | Integration | Diversity | Biomaterials | Feedback | Evolution | Balance

REFERENCES:

- Bioinspired, Tree-Root-Like Interfacial Designs for Structural Batteries with Enhanced Mechanical Properties Tianwei Jin
- Liu, N., Lu, Z., Zhao, J. et al. A pomegranate-inspired nanoscale design for large-volume-change lithium battery anodes.
- Bioinspired, Spine-Like, Flexible, Rechargeable Lithium-Ion Batteries with High Energy Density Guoyu Qian
- One-step synthesis of high surface-area honeycomb graphene clusters for highly efficient capacitive deionization Liang Chang
- Projects | Veronika Kapsali. (n.d.). Veronika Kapsali. <https://www.veronikakapsali.com/projects-7>
- Liu, Z., Hu, R., Yu, R., Zheng, M., Zhang, Y., Chen, X., Shen, L., & Xia, Y. (2024). A gradient composite structure enables a stable micro-sized silicon Suboxide-Based anode for a High-Performance Lithium-Ion battery. Nano Letters. <https://doi.org/10.1021/acs.nanolett.4c00469>

“Nature doesn't have batteries, yet it solves similar problems”