Energy Storage

1. Dynamic polymer network (DPN) for battery

- DPN for Si anode: (enhancing Si lifetime by x10)
  - Decoupling ion conductivity with mechanical property
- DPN as stable Li anode coating
  - Hydrogen bonding

2. High-performance liquid electrolytes


3. Recyclable, stretchable solid-state battery

- Nature, 555, 83, 2018
- Science, 2021

4. Tissue-level modulus conducting materials

- Science, Advances, 3, 3, 2017
- JACS, 140, 5280, 2018
- Advanced Materials. 1706846, 2018

Skin-inspired Electronics

Skin-inspired Materials

1. Stretchable conductors, semiconductors

- Science Advances, 3, 3, 2017
- Science, 355, 59, 2017
- Nature, 555, 83, 2018

2. Self-healing, tough

- Nature Electronics 2018 Science, 2021

3. Biodegradable, transient

- JACS 2018, Nature, 555, 83, 2018

4. Tissue-level modulus conducting materials

- Science Advances, 3, 3, 2017
- JACS, 140, 5280, 2018

Skin-inspired Devices and Applications

1. Skin-inspired pressure, strain, shear sensor

- Sci. Robotics 2019

2. E-skin circuits, sensors and displays

- Nature, 555, 83, 2018
- Science, 2021

3. Wearable Chemical and Biological Sensors

- Nature Comm, 2014

4. Robotic, implantable, neuro-interface

- Sci. Robotics 2019
- Nature Biomedical Eng. 2019
- Nature, 555, 83, 2018
- Science, 2021
- PNAS, 2017

Porous carbon materials

- Energy storage, electrocatalysis, CO₂ absorption

- Designed carbon (structure/composition)
- Ordered pore structure
- High surface area, large pore volume
- Ultra-high CO₂/N₂ selectivity and high storage capacity

- Nature, 2022

Recyclable, re-processable functional materials

- Dynamic covalent & non-covalent network

- Nature Comm, 2014
- Chem. Mater. 2022

Materials

- Applications
- Process
- Energy
- Environment and Health

Skin-Inspired Materials and Devices for Energy, Environment and Health