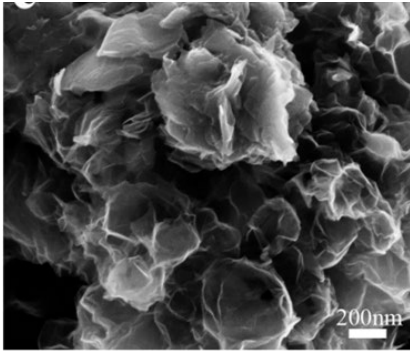


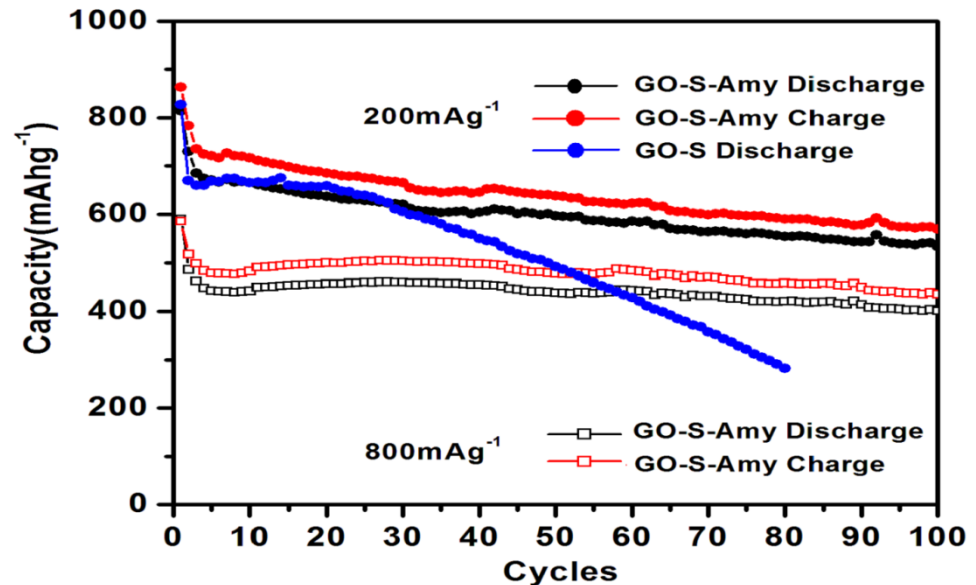


Advanced Materials for Rechargeable Batteries

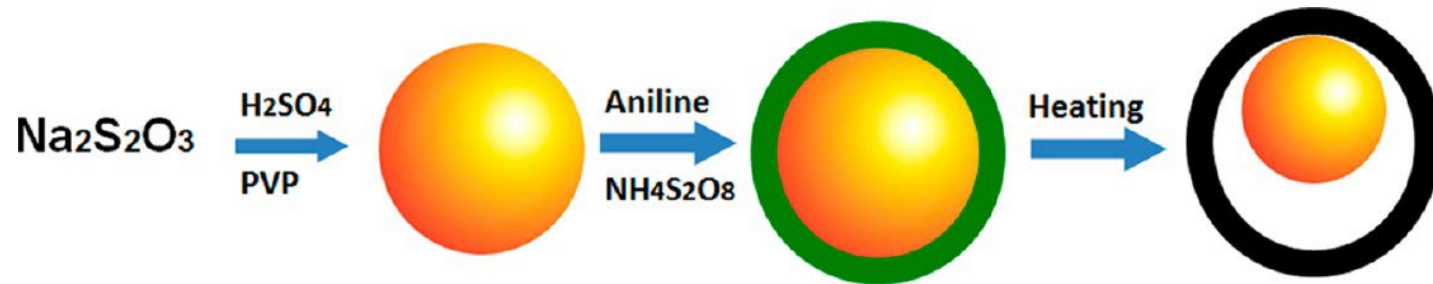
Natural Starch Additives for LiS Batteries



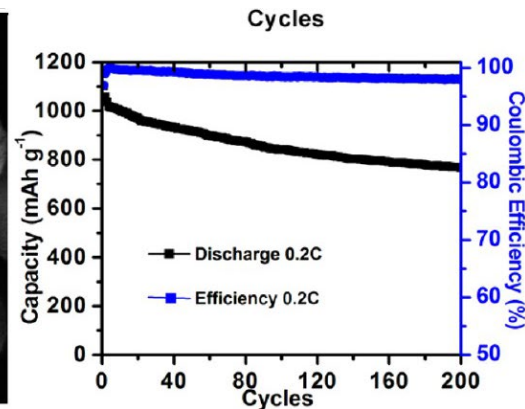
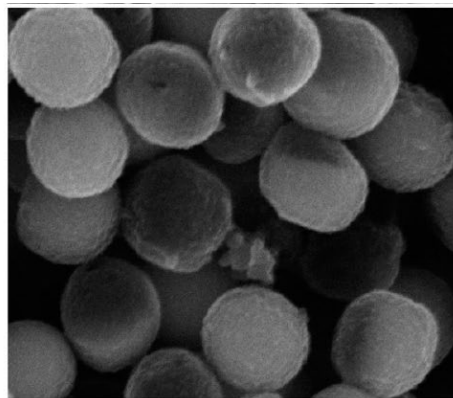
- Natural starch is added to sulfur-based cathodes doped with graphene oxide (GO).
- The starch additive immobilizes the polysulfides in the cathode, resulting in significant improvement in cyclability.
- Charge/discharge profiles for the GO-doped cathodes indicate excellent cycling performance and long-term stability.



Novel Coating Structure for LiS Batteries



- Yolk-shell nanocomposite is synthesized via heating vulcanization of a polyaniline-sulfure core-shell structure.
- Shell encapsulates sulfur to prevent dissolution
- Void space inside shell accommodates sulfur volume expansion
- Achieved stable capacity of 765 mAh/g at 0.2 C after 200 cycles



Applications & Advantages

Advantages of the technology:

- High capacity
- Inherent safety due to low reactivity of materials
- Naturally abundant and low-cost raw materials
- Stable cycling behavior

Battery replacement in a variety of applications:

- Electric vehicles
- Portable electronics
- Energy storage for solar and wind generated power



Patents & Contact Info

Patents:

- PCT Application # PCT/US14/33774, titled “Carbon-Sulfur Based Core-Shell Materials Compositions, Methods and Applications”
- PCT Application # PCT/US14/45573, titled “Coating Structure, Methods, and Applications for Li/S Batteries”

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