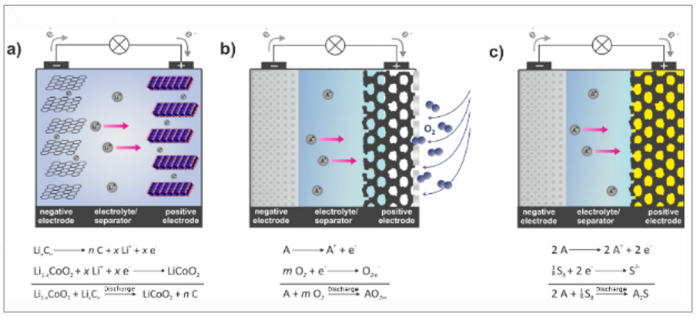
Cost Effective Battery for Renewable Energy Storage

VTIP 19-063: "A High-Energy Density Sodium-(Oxygen)-Sulfur Battery"

THE CHALLENGE

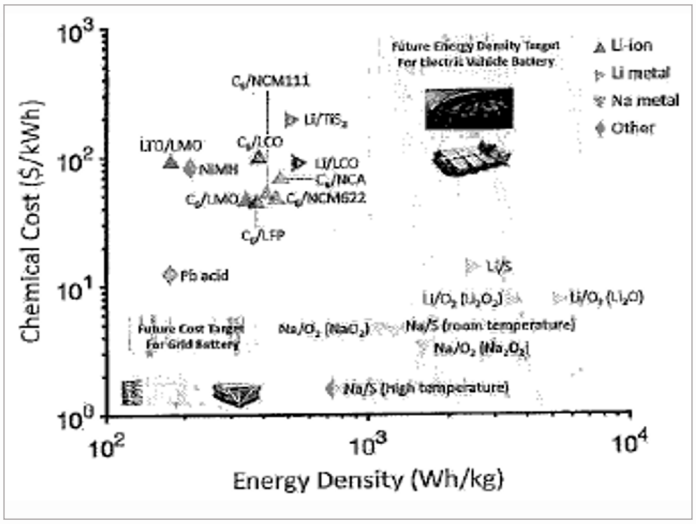
Concerns over sustainability of the global energy supply and climate change have spurred intensive research into energy storage technologies to facilitate the growth and integration of renewable energy sources like wind and solar. Electrochemical battery systems are the most promising energy storage technologies that can meet energy density and cost requirements for long term and widespread use. Today's lithium ion batteries can hardly meet energy requirements and resource constraints of elements used in electrode couples could prevent the scale-up of battery production and wider adoption. Therefore, high-energy density electrochemical battery systems using abundant and low-cost materials are needed to meet present and future challenges.



Illustrated operating principles of lithium-ion (left), metal-oxygen (middle), and metal-sulfur (right) battery discharge (Beilstein Journal of Nanotechnology).

OUR SOLUTION

Sanpei Zhang and his team have developed a new type of high-energy density sodium-(oxygen)-sulfur battery. The invention has a high higher capacity compared to sodium-sulfur and more stable cycling performance than sodium-oxygen batteries. Furthermore, it has a lower chemical cost overall and, due to its ambient operating condition, will be safer and cheaper to scale up to mass production.



Plot of chemical cost vs. energy density for potential chemical battery options.

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