Designing Advanced Battery Materials Beyond Lithium-Ion Technology

Z. Seh[1]

[1]Institute of Materials Research and Engineering, A*STAR, 2 Fusionopolis Way, Innovis, Singapore 138634

Achieving a sustainable energy future is one of the key challenges facing humanity today. Metal-sulfur batteries represent very attractive energy storage systems, as their energy density and elemental abundance are much higher than that of lithium-ion batteries today. However, these batteries are plagued with problems relating to dendrite growth, polysulfide dissolution, and poor conductivity, necessitating advanced material design strategies. I will present our recent work on anode, cathode and electrolyte development, including protection of metal anodes using artificial interphases, inhibition of polysulfide dissolution at sulfur cathodes, and discovery of new promising electrolytes. The combination of these strategies result in metal-sulfur batteries with stable capacity and long lifetime over 1000 cycles.