

New Cost-effective Materials and New Processes of Electrodes for Li-ion Batteries

Dr. Pardha Saradhi Maram

Materials for Li-ion batteries, with energy density up to 350 Wh/Kg

Cobalt-free cathode materials and flame-resistant electrolytes for Li-ion battery



Methodology

- **Continuous Stirred Tank Reactor** – Excellent tool for industrial-scale production of engineered battery cathode materials
- Small crystallites agglomerated to form an open framework morphology of bigger **secondary particles, 6 – 8 μm**
- **High throughput**, Good reproducibility, Uniform particle size, Specific morphology,
- Doping and coating on NMC to avoid surface side reactions, enhance structure stability and **electrochemical cyclic stability**
- Cobalt being an expensive element, an alternative **low-cost Aluminium and Manganese compositions**

Results

- B/Zr/Ti coating on NCM622 has shown superior electrochemical performance than the other coatings
- By protecting the surface of the NCM622 has increased the cyclic stability and rate capability even at elevated temperatures

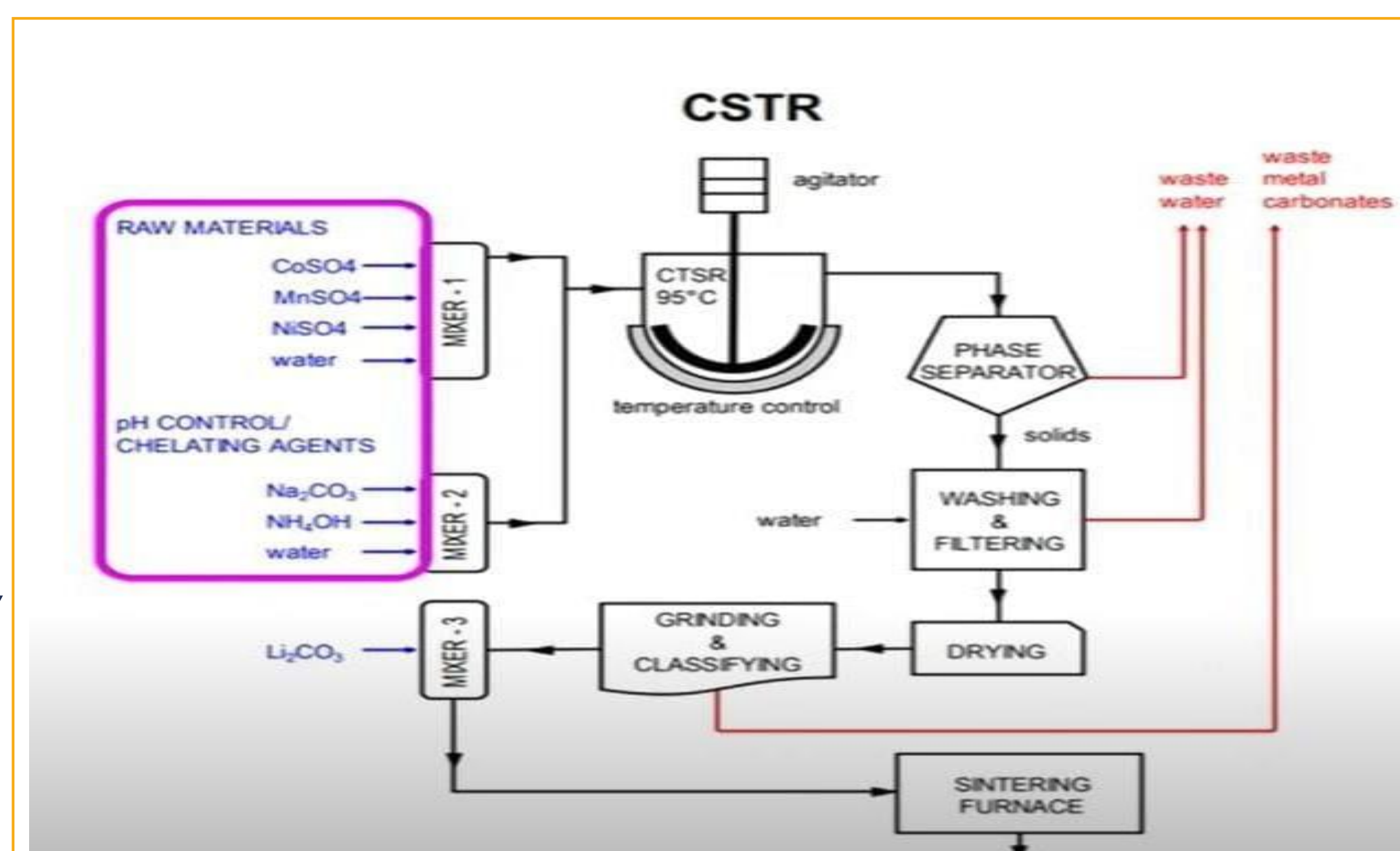
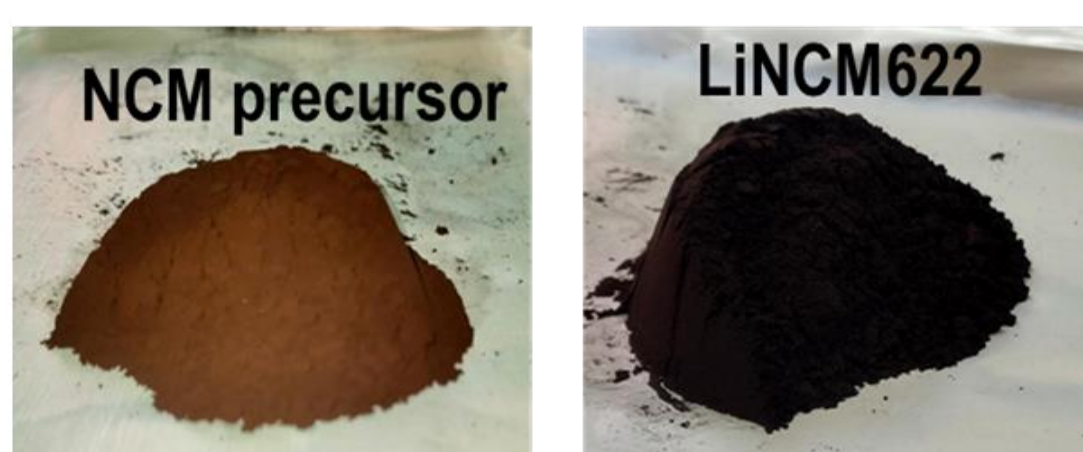
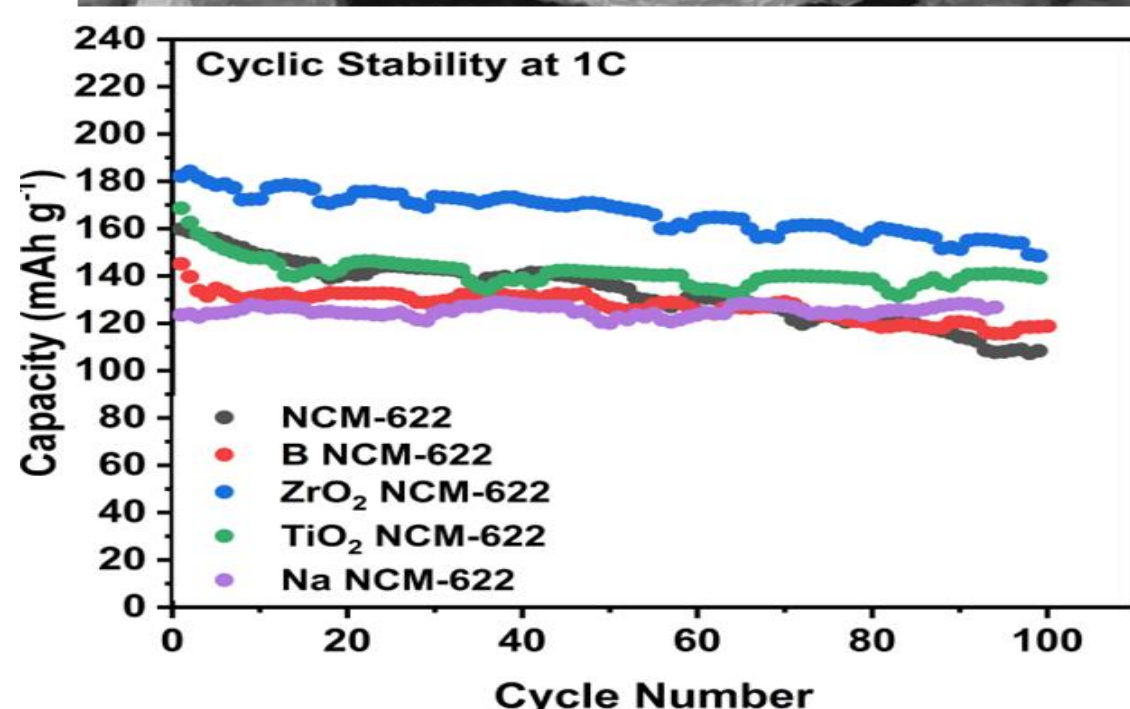
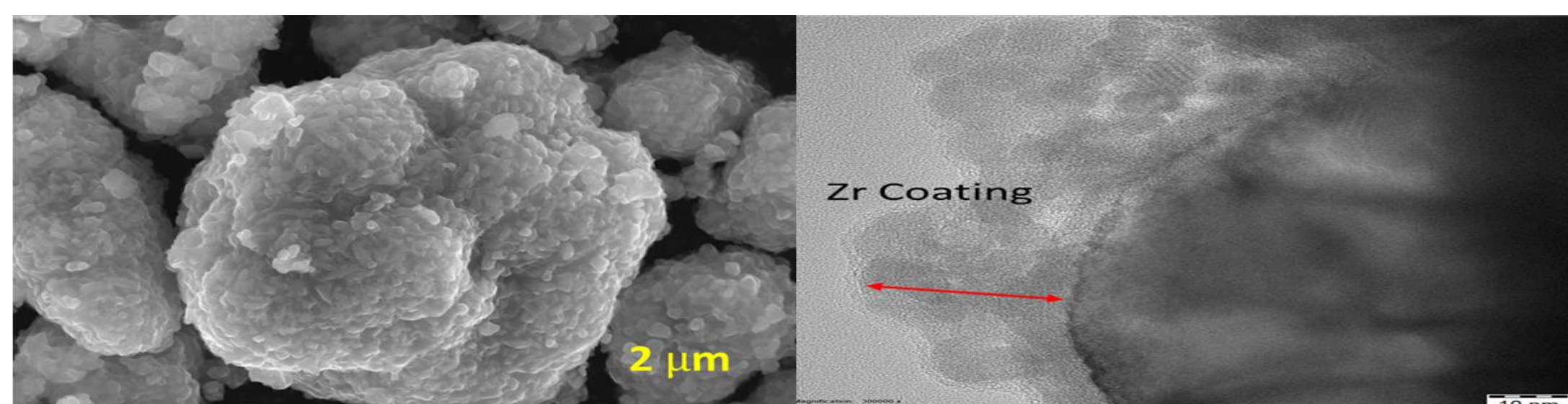


Figure 1: Schematics of the CSTR experimental procedure indicate the nature of precursors, precipitating and chelating agents

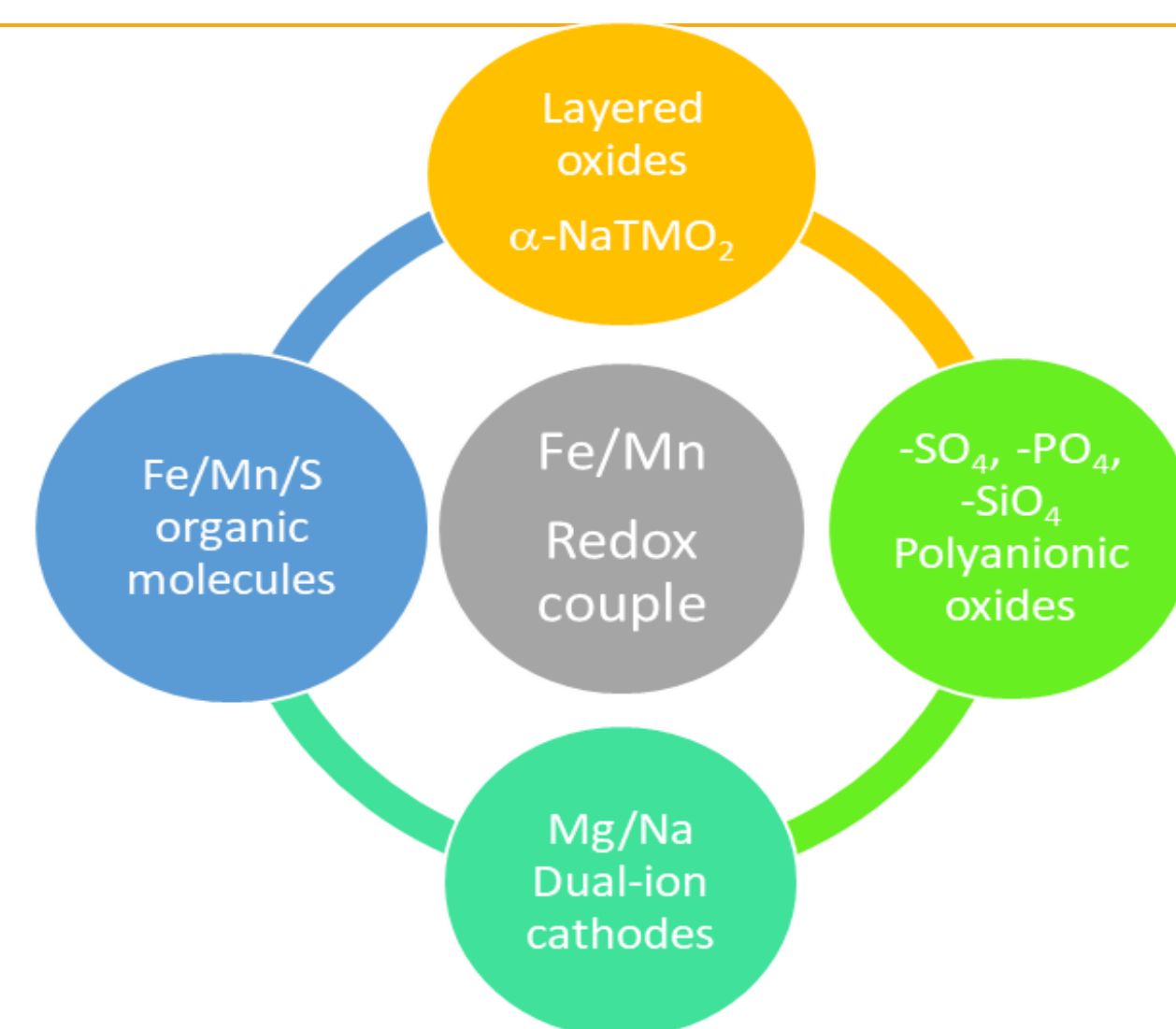


Figure 2: Strategies for developing low-cost cathodes for LIB/NIB

