

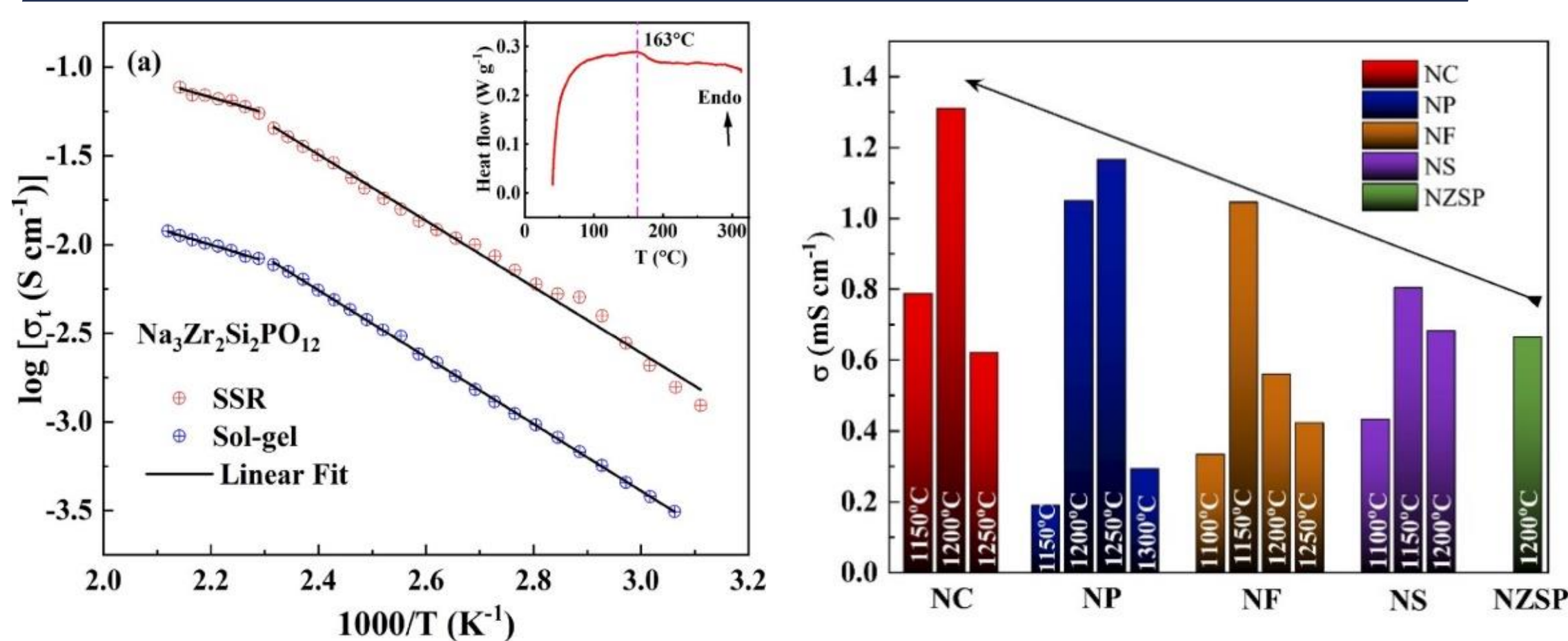
Alternative energy storage technologies (Na-ion), including solid-state batteries for emerging applications

Dr. LN Patro

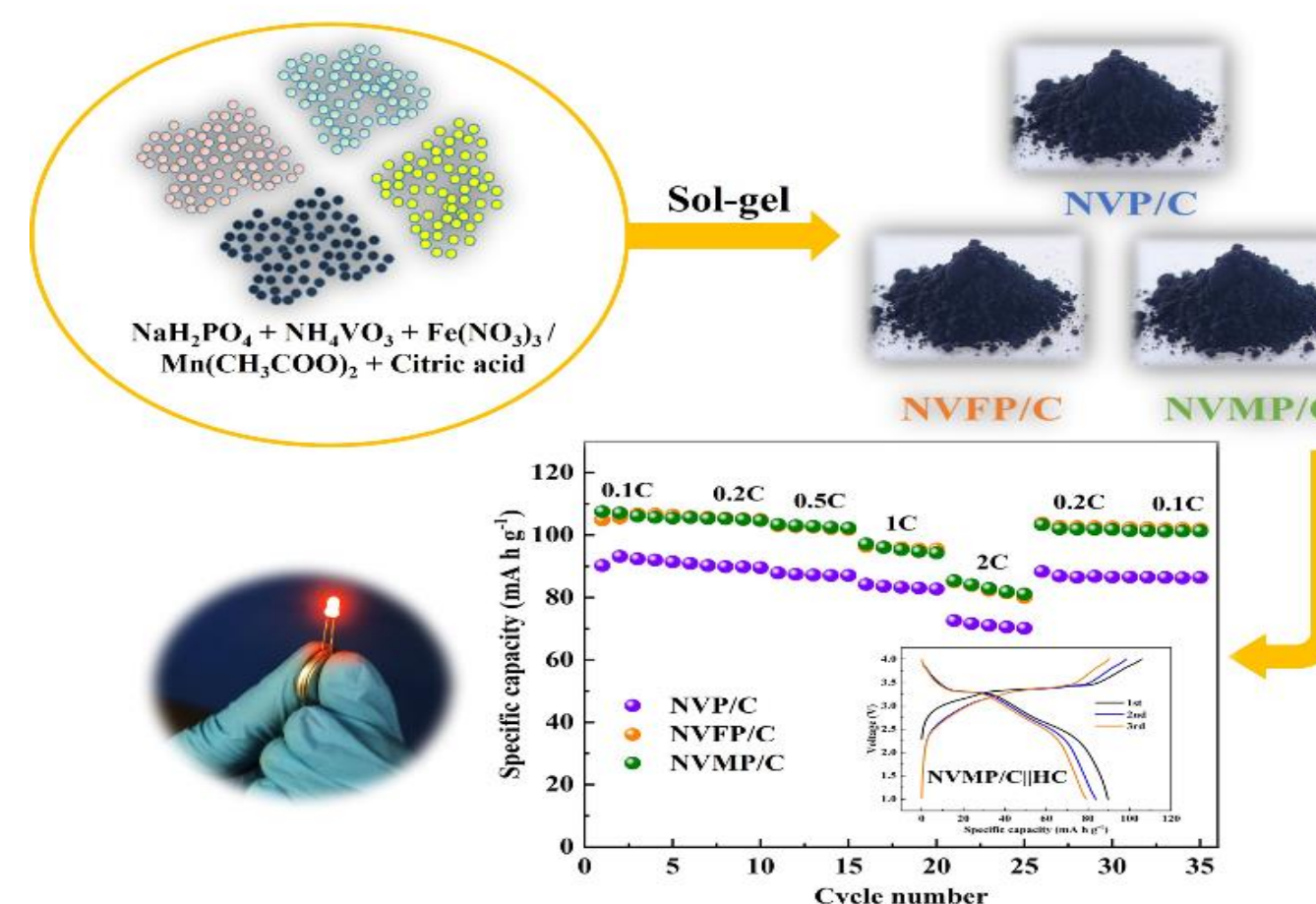


- **NZSP based Solid Electrolytes for Na-ion Batteries**
- **NVP/C based Cathode Materials**
- **Biomass derived Hard Carbon Anode Materials**
- **Full cells and All-Solid-State Na-ion Batteries**

NZSP based Solid Electrolytes



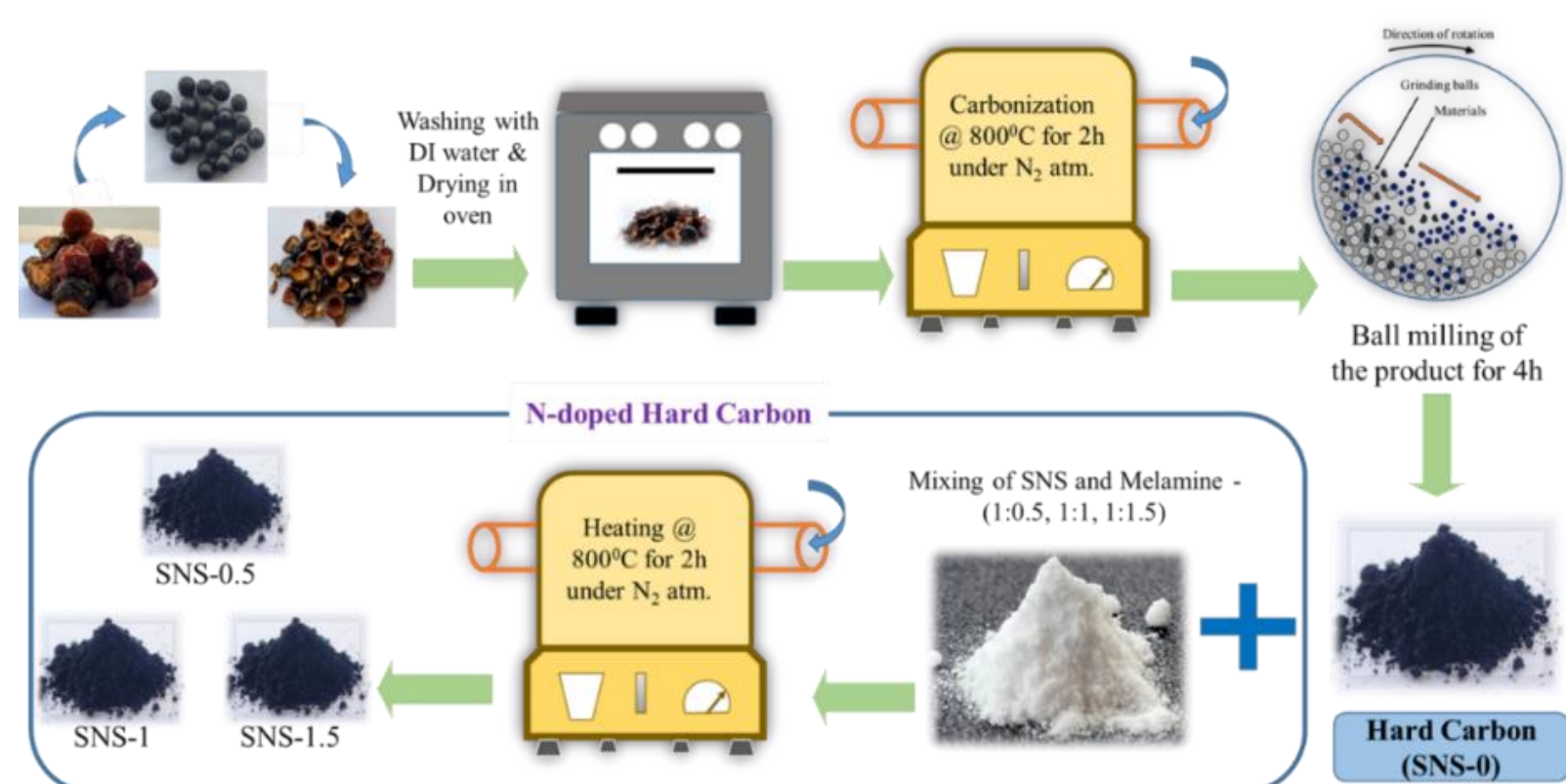
NVP/C based Cathode Materials



✓ Observation of NC with good ionic conductivity value ($\geq 1.3 \text{ mS cm}^{-1}$), ionic transport number close to unity and wide electrochemical stability window up to 5.2 V [LN Patro, J Mater. Sci. 58 (2023) 2222–2233; LN Patro et al, Mater. Lett. 301 (2021) 30267].

✓ The electrochemical studies on both the half and full cells using the NVMP/C electrode show its feasibility to be used as a potential cathode material for the low-cost and next generation rechargeable Na-ion batteries [LN Patro et al, ACS omega 7 (2022) 48192-48201]

Biomass derived Hard Carbon



✓ Conversion of low-cost, biomass-waste precursor soap-nut seeds into an efficient and safe anode material [LN Patro, J. Alloys Compd. 968 (2023) 171917].

Full Cell and All-Solid-State Battery

