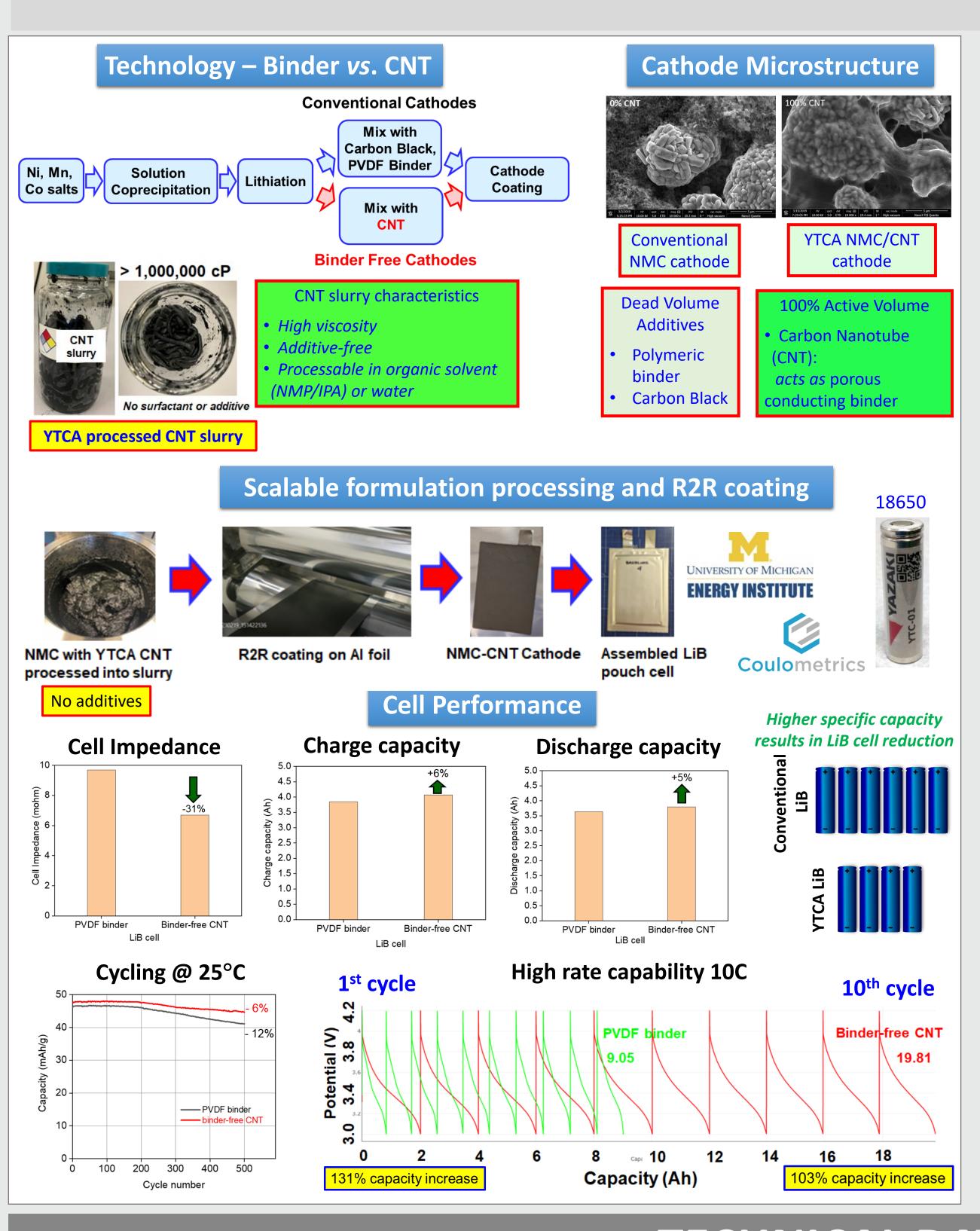
Advanced Energy Storage Materials

Binder-free cathode enabling high capacity Li-ion battery

Li-ion batteries have polymeric binder in their electrodes resulting in high internal resistance and hence long charge times and short product lifetime. Binder-free Ni-Mn-Co (NMC) cathodes containing carbon nanotube (CNT) provide a solution to extend the product lifetime as well as providing increased capacity and rate capability. Our proprietary processing of CNT into viscous organic or water-based slurry without a surfactant or dispersant reduces or eliminates the need for organic binder and carbon black additives in conventional cathodes. Our batteries show superior performance over binder-containing cells.



HIGHLIGHTS

Compared to LiB cells with bindercontaining NMC cathodes, cells with binder free NMC-CNT cathodes provide:

- 31% lower cell resistance
- 6% *vs.* 12% capacity fade after 500 cycles
- 2x improvement in cell capacity at high 10C discharge rate
- 5% higher capacity
- ■Scalable R2R coating of NMC/CNT cathodes without binder & carbon black additives

TECHNICAL DATA

LIB POUCH CELL	LiB pouch cell with NMC/PVDF/CB cathode	YTCA binder-free LiB pouch cell with NMC/CNT cathode		
Capacity [Ah/kg]	49.9	51.1		
Cell impedance [m Ω]	9.7	6.7		
Specific Energy [Wh/kg]	185.4	190.0		
Specific Power [W/kg]	23.0	21.0		
10C Capacity [Ah/kg]	11.4	28.7		

LIB 18650 CELL	Specific Energy [Wh/kg]		Specific Power [W/kg]	
Current (A)	Binder	CNT	Binder	CNT
1	126.7	145.5	87.0	89.0
2	122.7	141.5	173.1	177.2
4	118.1	137.3	344.2	352.3
10	107.7	130.6	846.5	867.3
20	81.9	119.8	1640.2	1689.3

CONTACT INFO: INFO@YTCA.COM