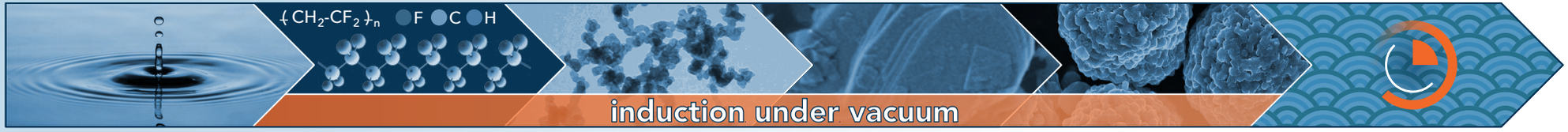
Batt-TDS™

Accelerating Lithium-ion Battery R&D and Gigafactory Production

Mixing process workflow



add **solvent** to vessel	dissolve **binder** at 20-25 °C	disperse **carbon black**	disperse **conductive additives**	disperse **active material**	circulate until homogeneous

Benefits

- Elimination of dry mixing and dust in handling.
- Binder solution made in sequence in 3 min after induction, independent of batch size.
- Dramatic shortening of active mixing times / shear exposure to milliseconds.
- Processing of high-solids slurries.
- Independent control of process parameters to optimise for specific task. Tailor dispersion of aciniform structures or gently disperse abrasive powders.
- Compact footprint with the highest productivity per m^3.
- Lowest energy costs per kg of slurry produced.
- Less machines per GWh = smaller factories & lower infrastructure costs.

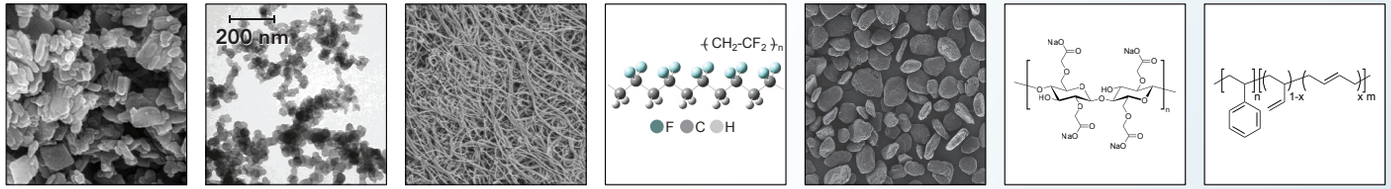
5 July 2021

battery@ystral.com

Batt-TDS™ PRO

Unprecedented scaling for mixing LFP-based battery slurries

40 GWh / annum	2800-L planetary mixer (Chinese)	twin-screw extruder / kneader	Batt-TDS™ PRO mid	Batt-TDS™ PRO supra
productivity (L/h, formulation dependent)	500	2,500	2,800	5,100
footprint (m x m)	2.7 x 3.1	15 x 6	5.8 x 4.8	6.4 x 5.4
total footprint (m^2), excluding paths	221	540	167	138
minimum systems needed	26	6	6	4
excess capacity beyond assumptions	5.9%	22.2%	36.9%	66.2%
labor per system (FTE)	3-4	1-2	<1	<1
price savings / production capacity per L/h (machine basis)	-	4%	48%	Are you ready?
investment savings	-	-11%	33%	



Assumptions, based on BatPaC (DOI: 10.2172/1503280)

Advanced LFP, 200 Wh/g

cathode, anode : 45.5 wt% solids

effective slurry energy density: 453 Wh/L

operating hours per annum: 7200

slurry needed per operating hour: 12,274 L

Scope of supply does not include powder conveyance or debagging, which must be automated separately to achieve maximum performance.

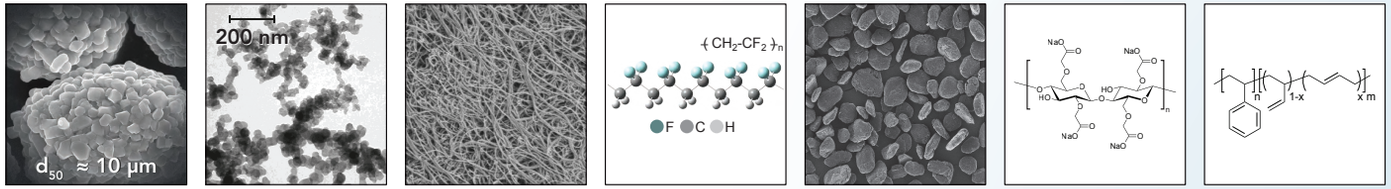
Batt-TDS™ PROmid

Batt-TDS™ PRO

Unprecedented scaling for mixing NMC-based battery slurries

40 GWh / annum	2800-L planetary mixer (Chinese)	twin-screw extruder / kneader	Batt-TDS™ PRO mid	Batt-TDS™ PRO supra
productivity (L/h, formulation dependent)	500	2,500	2,800	5,100
footprint (m x m)	2.7 x 3.1	15 x 6	5.8 x 4.8	6.4 x 5.4
total footprint (m^2), excluding paths	170	360	111	69
minimum systems needed	20	4	4	2
excess capacity beyond assumptions	5.8%	5.8%	18.5%	7.9%
labor per system (FTE)	3-4	1-2	<1	<1
price savings / production capacity per L/h (machine basis)	-	4%	48%	Are you ready?
investment savings	-	4%	42%	

NMC 622 | carbon black | carbon nanotubes | PVDF | SMG | Na-CMC | SBR



Assumptions, based on BatPaC (DOI: 10.2172/1503280)

NMC 622, 180 Wh/g

cathode: 72 wt%, anode: 45.5 wt% solids

effective slurry energy density: 588 Wh/L

operating hours per annum: 7200

slurry needed per operating hour: 9450 L

Scope of supply does not include powder conveyance or debagging, which must be automated separately to achieve maximum performance.

Batt-TDS™ PROmid