

Quantifying Fibrillation Powder Rheology to Optimize Dry Electrode Process for Lithium-ion Batteries

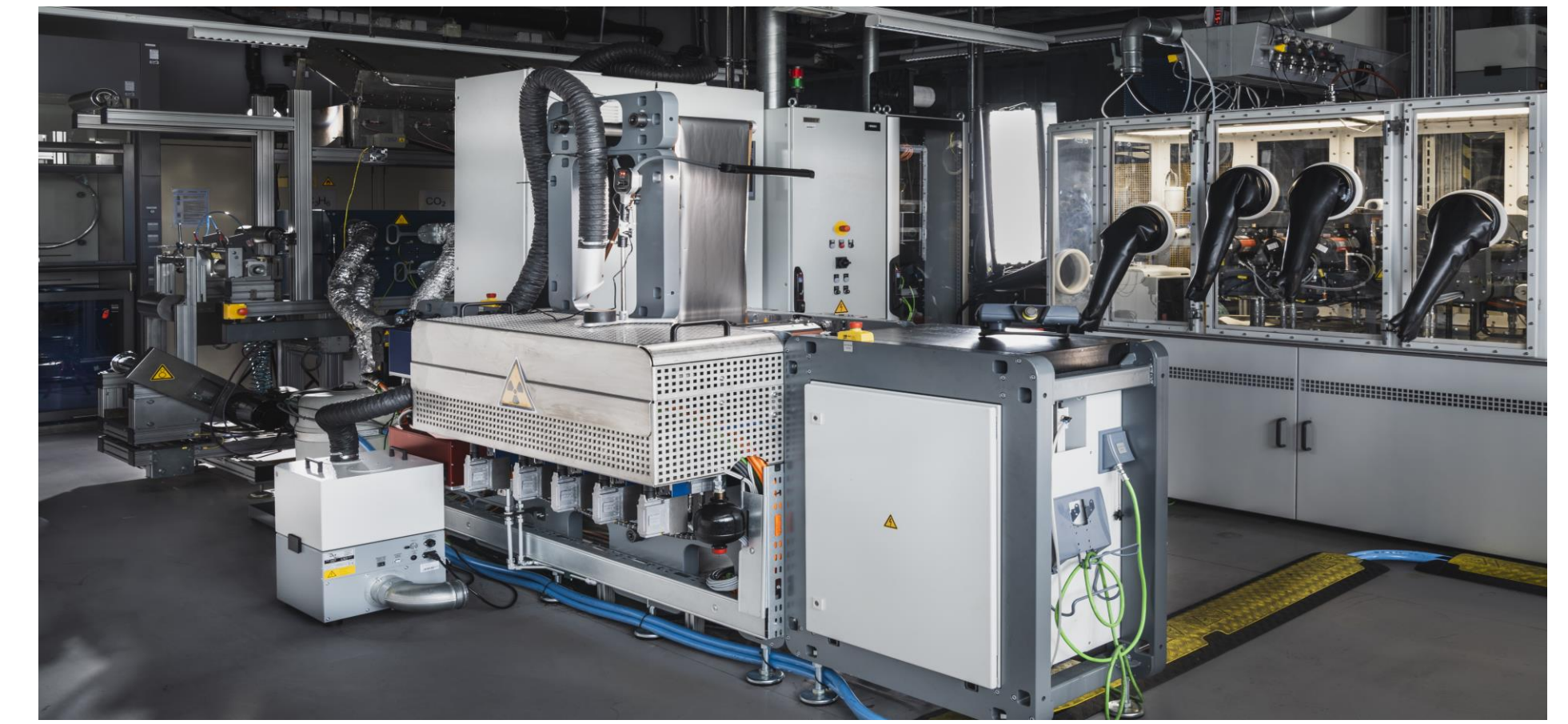
Arthur DUPUY^a, Milena LUX^a, Benjamin SCHUMM^a, Stefan KASKEL^{a,b}

^aBusiness Unit Chemical Surface and Reaction Technology, Fraunhofer Institute for Material and Beam Technology, 01277, Dresden, Germany

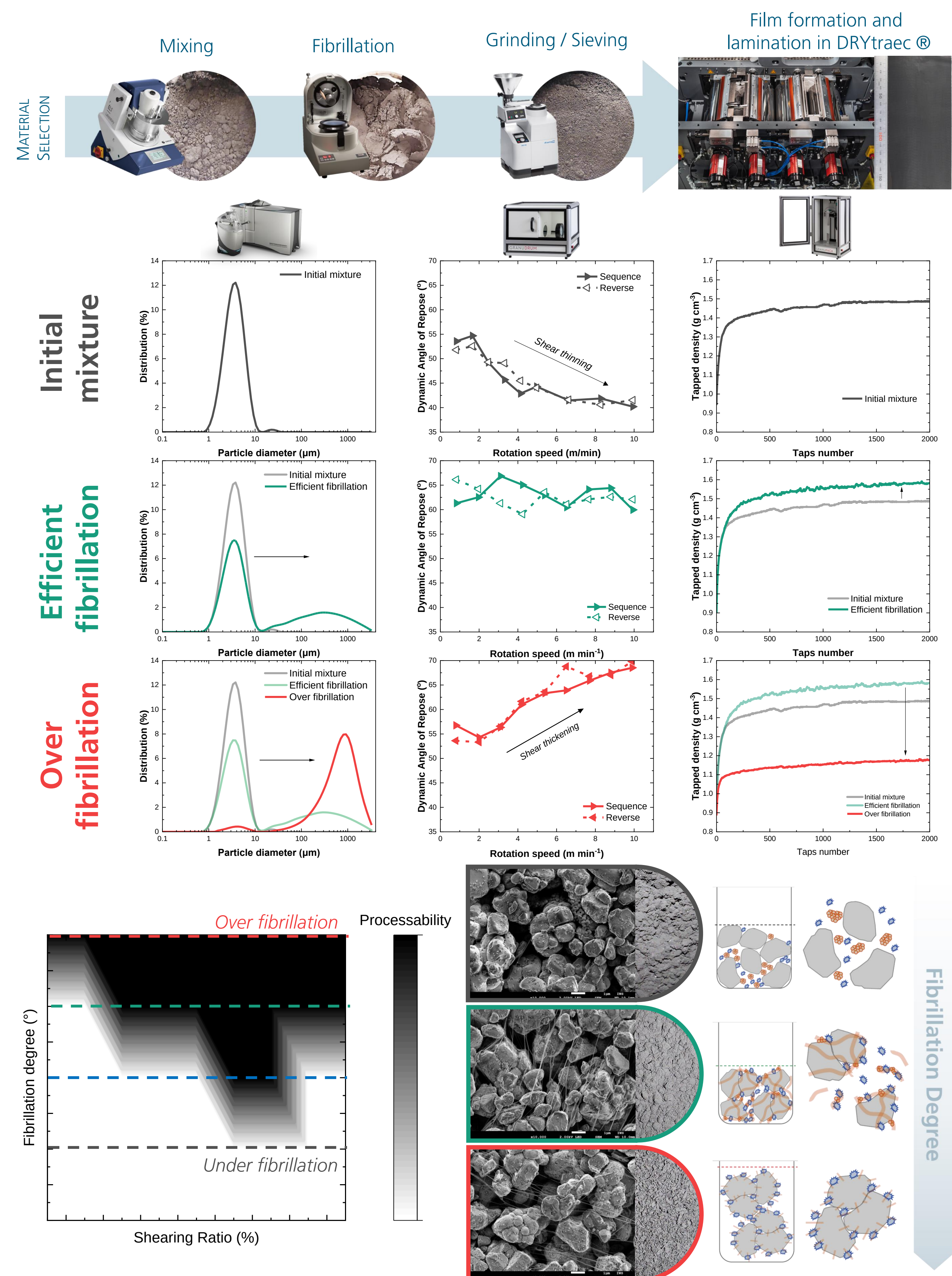
^bTU Dresden, Chair for Inorganic Chemistry I, Bergstraße 66, 01069 Dresden, Germany

MOTIVATION

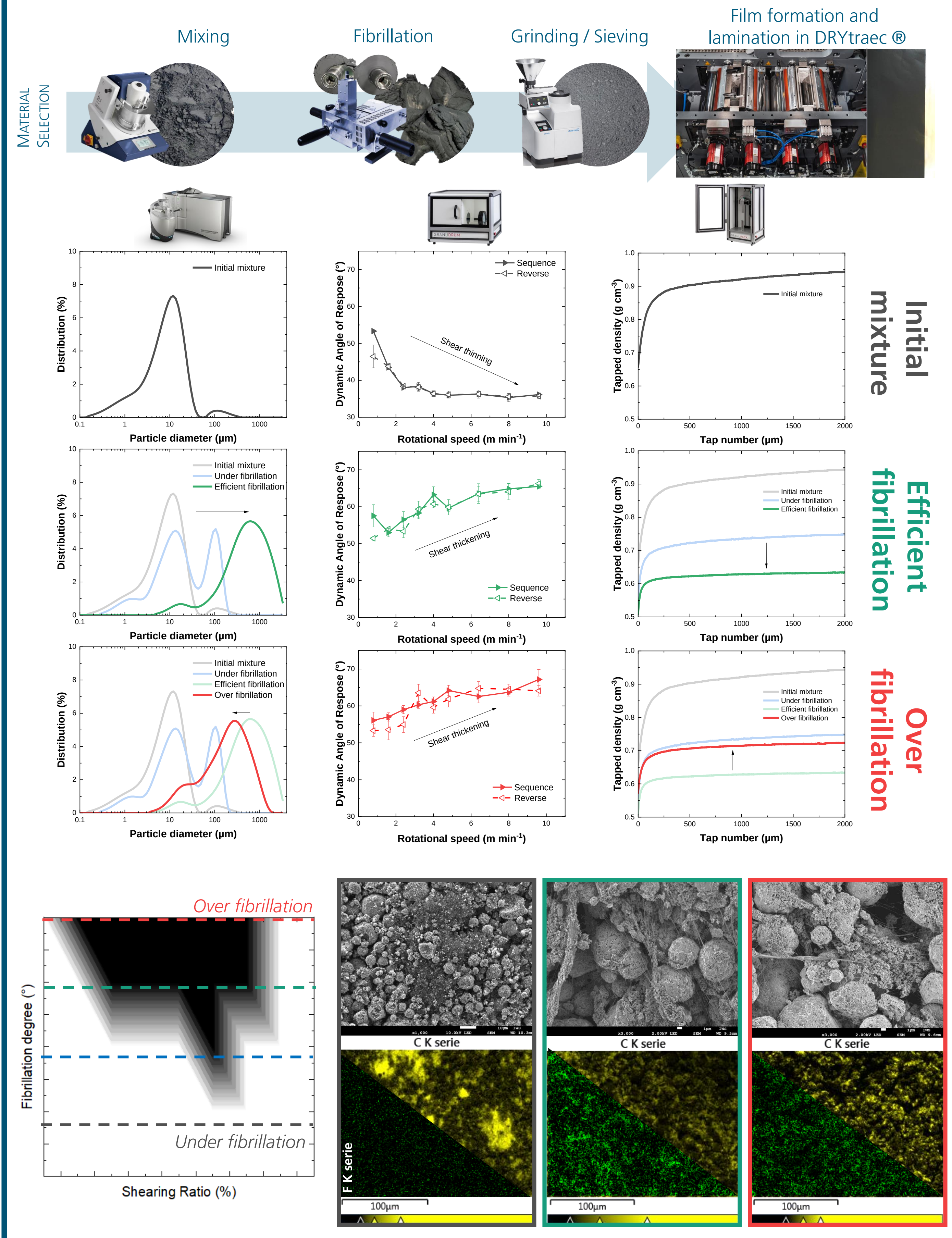
- To bring safer and more performant batteries to society¹
- Improvement of energy consumption and equipment footprint²
- To bring manual dry film process to prototype-scale production^{3,4}
- Higher TRL process technology for full-scale commercialisation
- To control in advance powder quality and electrode properties



NMC EVALUATION BY HIGH INTENSITY MIXING



LFP EVALUATION BY KNEADER MIXING



CONCLUSION

For NMC-based powder

- Observation of powder variation over fibrillation degree
- Optimum of flowability and maximal tapped density at specific fibrillation degree
- Processability directly impacted by fibrillation degree

For LFP-based powder

- Observation of powder variation over fibrillation degree
- Different trends observed for LFP than NMC
- Lower processability also observed
- Better understanding to develop regarding powder compression