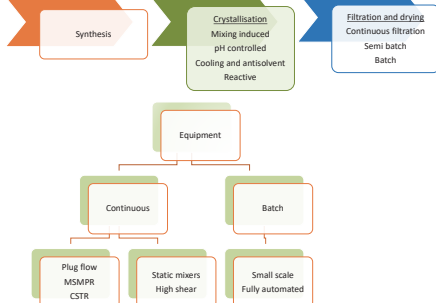




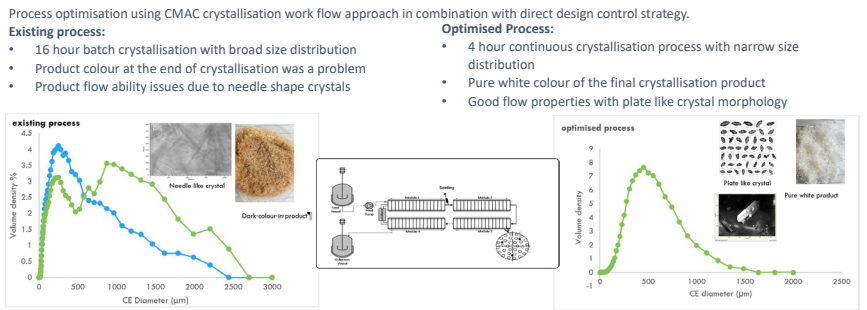
Continuous Crystallisation – Case Studies

H. Siddique, CMAC National Facility Team

Continuous Process Development

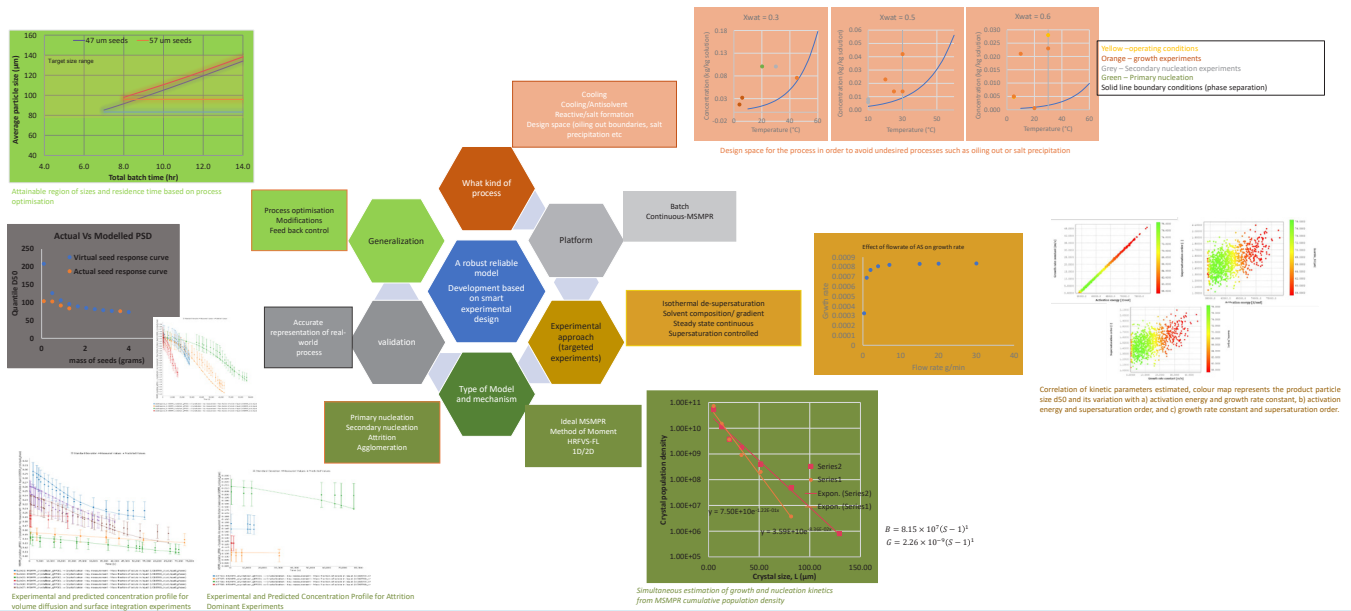


Case Study 1: Process Optimisation – Seeded Cooling Crystallisation



Case Study 4: Crystallisation model development

A first principle approach to understand process kinetics is core for process development and optimisation. We have developed models by applying a range of experimental approaches adapted to meet the needs of the process.



Case Study 3: Mixing Induced Crystallisation

Existing process:

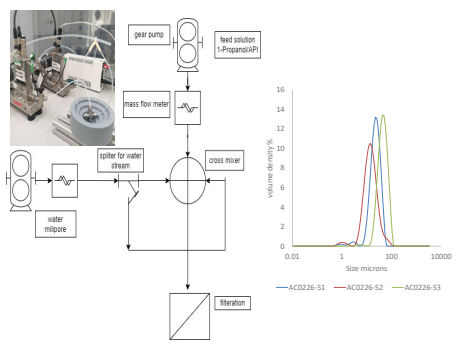
- Unable to achieve desired particle size
- Fouling and encrustation

Developed process: dial a particles size – a range of sizes within specifications fouling and encrustation free system (solvent selection)

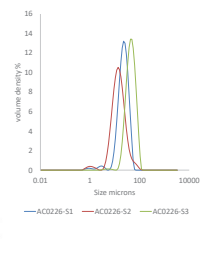
Workflow Approach to design Process

1. System Familiarisation
2. Solvent Selection
3. Solid-state & stability test
4. Determine thermodynamic / phase diagram
5. Select crystallisation method, supersaturation & nucleation control
6. Select mixing & platform, test processing & kinetics
7. Optimise for consistency/robustness

Platform development



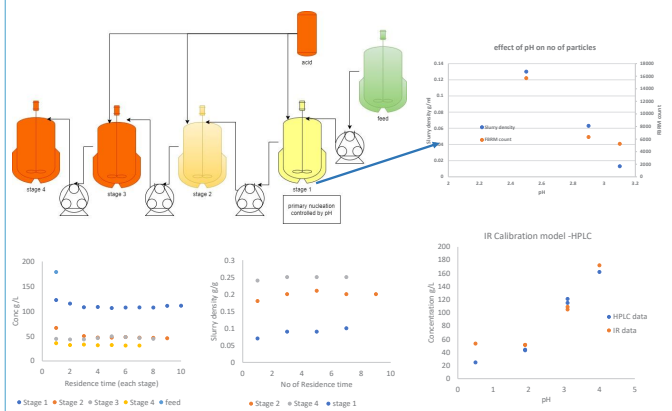
Outcome



Case Study 2: pH Controlled Continuous Crystallisation – Tuning Particle Size

From a conventional 3hr batch process to 1 hr continuous pH crystallization in 4 stage MSMPR platform

- Tuning of particle size by controlling nucleation (variable – pH, inline infrared spectroscopy feed back control)
- A robust calibration model to track concentration and apply feedback control tune particle size
- Desired product yield and throughput



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