ALMAC

Partnering to Advance Human Health

Brochure

# Crystallisation process development

## Work programs

As a world leader in pharmaceutical services, Almac delivers bespoke crystallisation development work programs for small molecules and peptides designed to provide a robust, scaleable, and transferrable crystallisation procedure to help accelerate clinical development and minimise risk in any downstream activities by eliminating batch-to-batch variability. The goals of typical studies include:

- Impurity rejection / purge studies
- Kinetics of nucleation and growth
- Polymorphic form control
- Maximising yield
- Morphology engineering studies
- Particle size control
- Bulk density and powder flow improvement
- Milling and micronisation studies
- Isolation and drying processes
- Control over residual solvent
- Seeding protocol

By coupling crystallisation process development technology with a quality by design (QbD) approach, Almac's crystallisation process development group utilise first-hand experience of scale-up operations to facilitate efficient tech transfer to kilo and plant scale. To ensure the process is suitable for scale-up, the following development tools are used:

- Parallel reactors (HEL Polyblock, easyMax, STEM integrity 10, and Crystal16)
- Temperature controlled jacketed reactor vessels from 0.1 to 20L scale
- Variety of impellers
- Agitated filter drier and pressure filter driers
- Tray driers with and without dry nitrogen bleed
- Wet milling equipment (IKA magic LAB)
- Blaze Metrics process analytical technology with on-line Raman analysis (IKA magic LAB)
- Wet milling (IKA magic LAB) and jet milling (Alpine 50AS)
- Dynochem right first time scaleup and modelling tool
- JMP and Minitab statistical software to aid Design of experiments (DoE) studies to understand process critical process parameters (CPPs)

As an integral part of Almac's Physical Sciences group, the crystallisation process development team are experts in solid state / solid form development and have access to state-of-the-art techniques for troubleshooting solid form and chemical challenges.

### Solid-state characterisation and chemical identification

- Powder X-ray diffraction (PXRD) with indexing
- Variable temperature powder X-ray diffraction (VT-PXRD)
- Polarised light microscopy (PLM) and high-powered digital microscopy
- Scanning electron microscopy (SEM)
- Thermal analysis (TG/DTA, DSC, and hyper DSC)
- Single crystal X-ray diffraction (SC-XRD)
- Solution and solid-state nuclear magnetic resonance spectroscopy (NMR)
- Fourier transform infrared spectroscopy (FT-IR)
- Raman spectroscopy
- Particle size determination by Malvern Mastersizer 3000 laser light diffraction and Sympatec particle size/shape analyser
- HPLC / UPLC for solubility and impurity rejection
- Assessment of powder flowability (bulk/tapped density and rheology)

almacgroup.com

## Get in touch


Global HQ
+44 28 3833 2200

US HQ
+1 215 660 8500

Athlone, Ireland
+353 90 646 0200

sciences@almacgroup.com