

Process research with online / offline NMR

FLEX AUTOPLANT for process research with online / offline NMR



Quality by design (QbD), proven acceptable range (PAR) driven high-output process R&D / chemical development, preparative synthesis, work-up, and analysis with online / offline benchtop NMR.

Solution overview

The Chemspeed FLEX AUTOPLANT workstations have been designed for high output experimentation in the development and optimization of pharmaceuticals, agrochemicals, polymers, specialty chemicals, catalysts, cathode materials, photovoltaics materials, storage materials and many more.

- End-to-end process R&D / chemical development / scale-up
- Organic and inorganic synthesis, reactions under pressure
- Preparative synthesis
- Crystallization

The cutting edge process development workstation technology allows scientists to execute and perform a variety of workflows in a fully automated fashion and truly mimic the final industrial production process. It provides all the flexibility to optimize integrated reaction sequences, even if a complex configuration of reactors and feed vessels is required.

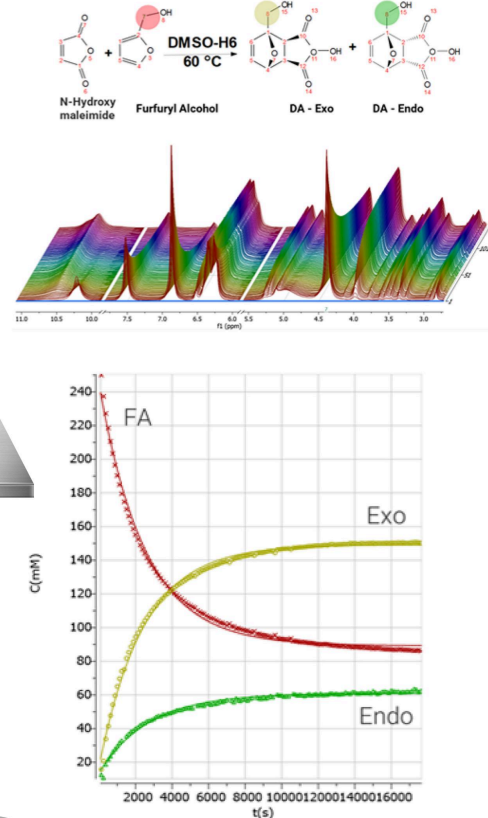
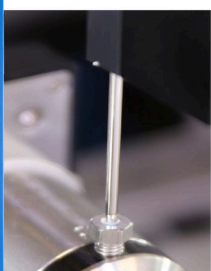
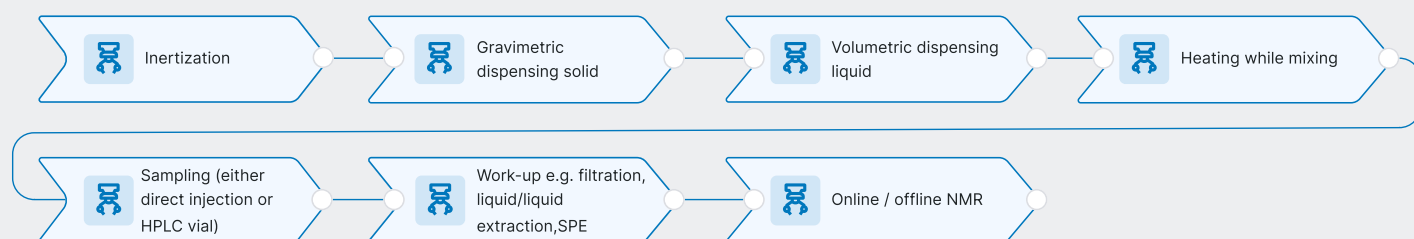
Key advantages & features

Each reactor with its own set of conditions - individually controlled and operated tank reactors (reactor volumes 100, 240, 1'000 mL total volume) with precise, continuous gas / liquefied gas / liquid feeds.

- Up to 6 syntheses per run on a FLEX AUTOPLANT (incl reaction prep, reaction execution, work-up, analysis).
- Easily exchangeable stirrer designs (anchor, twisted blade, gas entrainment stirrers...).
- Powerful mixing for viscosities up to 80 Pa.s at 300 rpm and 30 Pa.s at 900 rpm with an anchor stirrer.
- Flexible and precise continuous feeds.
- Multiple continuous liquid, liquefied gas and / or gas feeds per reactor and additional unlimited overhead access.
- Internal and / or jacket temperature control, reflux.
- Pressure up to 100 bar with corresponding safety installations.
- Parallel high-performance calorimetry and viscosity data.
- PAT interfaces to various in-situ probes, for example: pH, UV-VIS, IR, Raman, PSD, calorimetry.
- Measurement of gas consumption.
- Dean Stark water trap.
- Distillation bridge.
- Vacuum for different purposes: inertization, crystallization, ...
- Extraction, filtration, evaporation, crystallization, distillation.
- Ventilated hood for safety and conditioned (sensitive chemicals, low-temperature) operation.
- AUTOSUITE SOFTWARE - drag & drop experimentation with easy interface (e.g. python custom device) to e.g. LIMS, ELN, data analysis, AI / ML closed loop.
- Integrated online benchtop NMR with available operating frequency ranges of e.g. 80 / 90 MHz such as Bruker Fourier Rxn Lite, Magritek Spinsolve, incl
 - NMR device
 - Sample injection port, software and hardware integration
 - H, F, C, P, Si, B
 - 1D and 2D spectra
 - online data acquisition via flow cell or offline via standard 5 mm sample tubes
 - permanent magnet - no liquid nitrogen or helium required
 - 2 Gauss line inside NMR device housing

Example workflow

Chemspeed solutions can be configured to your exact workflow; here is an example of our end-to-end-nmr-and-lcms-sample-preparation workflow.



Accelerating your existing workflows

This example solution showcases one possible workflow using Chemspeed's technologies, but the possibilities are almost endless. Building your ideal platform has never been simpler with Chemspeed. From powder dispensing to chromatography, our configurable solutions are modular and constructed to suit your exact needs.

Combine a Chemspeed base platform, robotic tools from our extensive library, reactors, vessels, racks, vials and software to create a system that compliments and enhances your workflow.



Platforms

House your chemistry instrumentation in a solid platform. The nature of your project will decide the scale of system you require. Chemspeed offer three highly-versatile platforms as the basis for every possible instrumentation to be housed in: SWING, FLEX and FLEXSHUTTLE.



Tools

Chemspeed's extensive tool library contains more than 70 robotic tool-features that can be integrated with Chemspeed's unique robotic tool exchange technology, including unrivalled overhead gravimetric dispensing, which can operate while mixing, heating, refluxing and cooling. Virtually any combination of these robotic tools is possible.



Software

Quickly design, execute, analyze and report experiments with our AutoSuite software. Coordinate and orchestrate larger laboratory workflows with ArkSuite, or even digitalize your entire workflow, including manual tasks, using ArkSuite Sofia.

Automate and digitalize your laboratory with Chemspeed.

