

Photochemistry You Can See, Control, and Optimize

- Illumination + measurement + optimization in one platform
- Integrated real-time analytics and reaction telemetry
- Active stirring + liquid thermal management + NIR sensing
- Structured, machine-learnable data captured during the run
- AI-assisted closed-loop optimization architecture



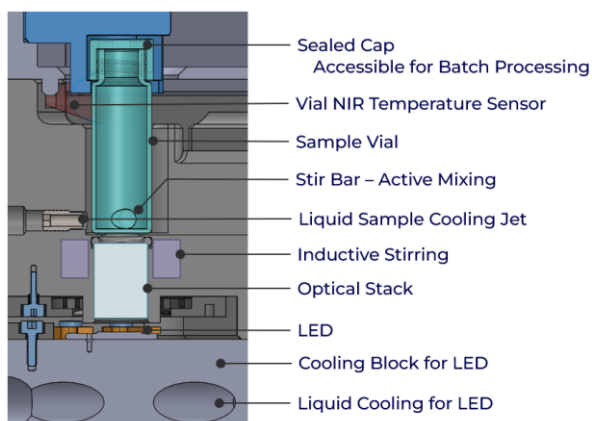
Value Proposition

CATALUMIX Clara is a reaction development platform that makes photochemistry repeatable, measurable, and scalable. Researchers use Clara as part of their reaction development workflow environment to capture critical parameters to understand how to reproduce their chemistry on a larger scale.

PATENT-PROTECTED PHOTONIC TECHNOLOGY

Real-Time, Machine-Learnable Chemistry

The CATALUMIX Clara architecture combines photonic energy delivery, active fluid stirring, thermal management, sensing, analytics, and data captured in a unified reaction-development platform.



TECHNOLOGY STACK

- Photonics layer: Integrated optics + stirring + sensing + intelligence.
- Thermal layer: Active liquid cooling for the sample and LED; non-contact NIR temperature sensing.
- Performance layer: Real-time reaction visibility designed to enable faster experimental learning.
- Intelligence layer: AI-assisted closed-loop optimization and structured reaction telemetry.
- Data layer: Real-time data capture supporting drug development, process transfer, and proprietary manufacturing knowledge.
- Validated performance claim: Delivers 7.5X more illumination power and 6x reaction speed (see reference 1)

Operating Specification

REACTION & PHOTONICS

Parameter	Preliminary specification
Positions / throughput	4 simultaneous reaction with independent intensity control
Reaction formats	Batch, supports automated batching and continuous flow
Vessels / working volume	4 mL, 8 mL and 40mL vials
Wavelength modules and maximum optical power (4 mL vial)	365nm at 9 watts 385nm at 10 watts 400nm at 12 watts 410nm at 14watts 430nm at 44 watts 450nm at 35 watts 535nm at 26 watts 620nm at 12 watts
Intensity range	10 – 100% (maximum)
Operating light modes	Continuous or Burst Mode
Stirring	Electromagnetic / inductive active mixing. Range from 700 – 1500 RPM
Reaction environment	Supports sealed vials
Electrical Power	100 – 240 VAC (+/- 10%) @ 50/60 Hz 15 A max @ 100-120 VAC 7.5 A max @ 200-250 VAC

THERMAL, ANALYTICS & SYSTEM

Parameter	Preliminary specification
Sample temperature range	Controlled by liquid cooling using a chiller. At a power of 40 watts temperature < 20C above chiller set point (see reference 2).
Temperature monitoring	Non-contact NIR sensor measures vial to +/- 1.0 C.
Thermal control	Active liquid cooling for sample and LED. Fixed temperature mode, option for varying intensity or chiller set point using supported chiller.
Data output	Real-time reaction data captured stored. Supports real time telemetry to cloud.
Safety	Door interlock, emergency stop, temperature monitoring, internal watchdog, led power interlocks, power input circuit breaker
Size	60 cm W x 30 cm H x 20 cm D – estimated (23.6 in W x 11.8 in H x 7.9 in D)
Weight	16 kg (32 lb.) estimated
Supports future platform functionality	Cloud based analytics of real-time data AI-assisted optimization and closed-loop control architecture Automated product vessel extraction and addition of new reagents with Catalumix's Flow Manager

The Core of Catalumix' s Intelligent Photochemical Development Platform

ILLUMINATE Precision photon delivery User Programmable Time + Intensity Multiple wavelength options CATALUMIX's proprietary Optical Stack ensures consistent light delivery	CONTROL Reaction environment Temperature maintained with CATALUMIX's proprietary water-jet technology. Active stirring with CATALUMIX's proprietary inductive mixing Closed-Loop control = Reactions kept at required temperature	MEASURE Chemistry in real time NIR temperature measurement taken without interfering with reaction. Telemetry used to support closed loop control. Supports external connection to spectroscopy.	OPTIMIZE Turn data into action Full access to reaction data AI-assisted adaptive control + learning Enabled by CATALUMIX's software platform
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TARGET APPLICATIONS

Drug Discovery & Medicinal Chemistry	Photoredox Catalysis	Reaction Screening & Optimization
Process Development & Scale-Up	Continuous-Flow Photochemistry	Process Analytics & Digital Control

References

- Reaction time improvement demonstrated on Metallophotoredox Arylation. Completion in 30 min. v. 180 min.
- Temperature range determined 20mg of MKCV8180 dissolved into a heated 200 ml Isopropyl 90% solution.



Give your team control over
Intensity
Wavelength
Temperature
Stir Rate
Time