

Luzchem

Shedding light on new ideas



May 2011

www.luzchem.com

Product lines

- Laser flash photolysis systems
- Photoreactors, exposure tools
- UV curing equipment
- Xenon illumination products
- Spectroscopy supplies
- Spectroradiometers
- Solar simulators

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Special needs?

If you have any features that you would like added to our products, we want to hear from you. Luzchem is always looking for ways to improve our products. Please contact us at sales@luzchem.com.

Our Cover: *Serenity Lake* by Elda Scaiano, 2007.

Exposure Tools, Accessories & Options

Luzchem offers a range of UV/Visible exposure tools for controlled irradiation. Different wavelength ranges in the UV and visible regions are available from both broadband fluorescent and xenon lamps.

Basic irradiation chambers have internal dimensions of approximately 12 inches wide, 12 inches deep, and 8.5 inches high (30 x 30 x 22 cm). Fan and safe exhaust are included with most chambers. One set of safety goggles (cut-off is approximately 420 nm) is included. All photoreactors are air cooled. The excellent air flow design stabilizes the temperature about 3-4°C above room temperature.



Photoreactor

Note: Most photoreactors can be manufactured for 110/220 V 50/60 Hz. Certain models will require a transformer where 220 V is standard. Please specify your needs at the time of order.

Basic photoreactors

Note: For Xenon photoreactors, see page 6.

Luzchem offers three photoreactor systems. Choose a basic photoreactor and add the accessories best suited for your needs. Customized packages normally take approximately 4-6 weeks for delivery.

Model	Lamp #	Arrangement	Notes
LZC-1	8	Top irradiation	Best for solids, films and Petri dishes
LZC-5	8	4 lamps on each side	Best for liquids
LZC-4	14	6 lamps on top, 4 on each side	Dual irradiation model

Lamps sold separately

Luzchem's range of pre-configured packages are designed to suit a variety of needs and applications and offer cost savings to the customer. These items are regular stock.

Photoreactor packages

LZC-4V: Versatile Top and Side Irradiation model V

- 6 top lamps and 8 side lamps
- 14 UVA lamps and 14 UVC lamps included
- Safety Features include: Safe Exhaust and Safety Goggles
- Installed options include: Installed Motor Drive and Recessed Magnetic Stirrer
- Carousel and Turntable for use with Installed Motor
- Power Meter for use with Luzchem LZC-VIS and LZC-UVA lamps
- Installed Digital Countdown Timer included



LZC-4X: Versatile Top and Side Irradiation model X

- 6 top lamps and 8 side lamps
- 14 UVA lamps and 14 UVC lamps included
- Safety Features include: Safe Exhaust and Safety Goggles
- Installed options include: Recessed Magnetic Stirrer
- Portable Carousel and Portable Turntable
- Power Meter for use with Luzchem LZC-VIS and LZC-UVA lamps

LZC-ORG: Organic Photochemistry model

- 10 side lamps
- 10 UVA lamps and 10 UVC lamps included
- Safety Features include: Safe Exhaust and Safety Goggles
- Installed options include: Recessed Magnetic Stirrer and Digital Timer
- Portable Carousel, 8 P-Tubes and 8 Q-Tubes

LZC-DEV: New Researchers Model

- 4 top lamps and 6 side lamps
- 10 UVA lamps
- Safety Features include: Safety shutdown and Safety Goggles
- Installed options include: Digital Timer
- Can be upgraded to **LZC-EDU** which includes prepared experiments, a portable carousel and more. For more info see www.luzchem.com/edu

CCP-4V: Computer controlled photoreactor

See page 7 for details

See pages 10 through 13 for a broad range of accessories and options.

Solar Simulators and Xenon photoreactors

Luzchem offers three xenon photoreactor models, all based on highly efficient air-cooled focused 300 Watt ceramic xenon lamps. All models include the following standard features: variable power, shutter, safety goggles, and filter adaptor. Normally supplied with a full UV lamp with elliptical mirror; ozone-free lamps are also available.

Full UV lamps have power from 200 nm into the near IR region.

Order: LFP-XE_300

Ozone free lamps eliminate wavelengths below 320 nm and can be vented into the laboratory atmosphere.

Order: XE300B-10F

For visible light only (420-700 nm), add a Hot Filter.

Order: XE-HF



Suitable for both 110/220 V, 50/60 Hz.

Solar Simulator - SolSim

Includes shutter, timer, filters required for solar simulation and light diffusers to improve homogeneity in the exposure area. Solar spectral data included in the manual.

Now offers variable power settings. Includes a factory calibrated power meter set to match AM1.5 intensity within +/-10%.



SUGGESTED COMBINATION:

For a package discount and reliable spectral measurements of your photoreactor's output, add a Spectroradiometer to your order.

Basic Xenon photoreactor LZCX-XE

Includes standard features. Options include digital timer, diffuser and temperature monitor.

ICH Option 1 Compliant LZCX-ICH1

Certified compliant with ICH guidelines option 1, includes shutter, timer and filters required for compliance. Every unit is supplied with energy mapping and certification.

Computer Controlled Photoreactors

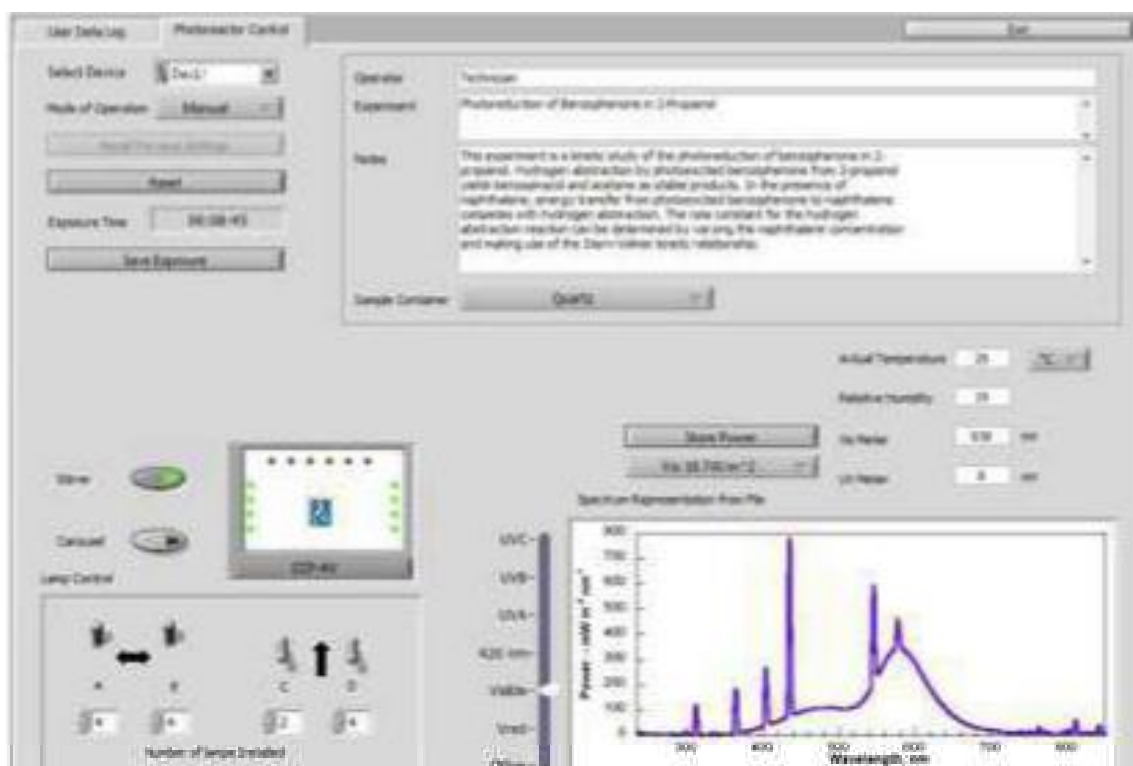
CCP-4V, CCP-ICH2 and CCP-ICH1

Luzchem has designed software to make record keeping and audit trails easy. Using a USB interface, exposure conditions, such as, exposure time, are controlled by the software with various parameters being logged. Ideal for testing in pharmaceutical industry as well as, any other application with stringent documentation requirements.



Logs exposure conditions such as:

• Users' experiment description	• Exposure time
• Configuration and type of lamps used	• Temperature
• User Comments	• Exposure dose



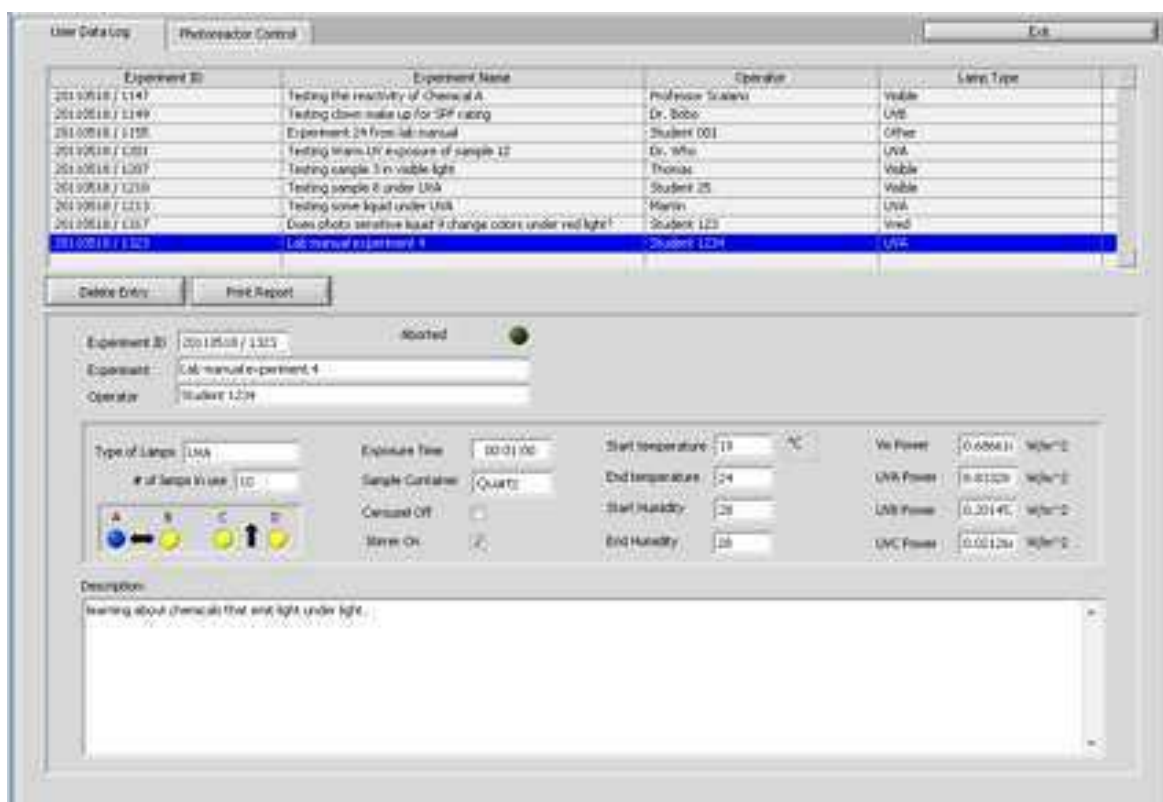
CCP-4V: Computer controlled photoreactor

- Fully computerized using a USB interface
- Includes Notebook computer with software pre-installed
- Software automatically logs exposure conditions on timed exposures
- 6 top lamps and 8 side lamps
- 14 UVA lamps and 14 UVC lamps included
- Safety Features include: Safe Exhaust and Safety Goggles
- Installed options include: Installed motor drive and magnetic stirrer
- Carousel and Turntable for use with installed motor drive
- Photodetector with two sensors for use with Luzchem LZC-VIS and LZC-UVA lamps

ICH compliant Computer Controlled Photoreactors

CCP-ICH2: ICH compliant under option 2

The latest in exposure technology. Fully computerized using a USB interface. Logs exposure conditions including temperature of the air exiting the chamber, humidity, lamps used and exposure time. User can add experiment descriptions and comments to the log. Certified compliant with ICH guidelines under option 2. Photoreactor accommodates 16 lamps. Includes 16 UVA and 16 VIS lamps, safe exhaust system, goggles, installed drive motor, carousel, turntable, recessed magnetic stirrer, UVA/VIS power meter and timer.



ICH Compliance and Photo safety Testing

ICH Option 2 Compliant Photoreactors (LZC-ICH2) (110 V standard - available in 220 V)

Certified compliant with ICH guidelines under option 2. Holds eight side and eight top lamps. Includes 16 UVA and 16 visible lamps, power meter, digital timer, carousel, turntable, recessed magnetic stirrer, bulkhead connector for gases, safety goggles and a safe exhaust system. Also included is temperature control from 25 to 45°C. Certification includes mapping of energy distribution in the chamber.




For detailed specifications see www.luzchem.com.

Computer controlled photoreactors (CCP-ICH2) (110 V standard - available in 220 V)

Certified compliant with ICH guidelines option 2. This computer controlled photoreactor uses a USB interface. It automatically logs exposure conditions. All exposure conditions are controlled from the software and parameters logged include exposure time and exposure dose. Ideal for pharmaceutical testing and any other industry with stringent documentation requirements. It includes UVA and Visible lamps (16 of each), safe exhaust system, a pair of safety goggles, installed drive motor, carousel, turntable and magnetic stirrer.



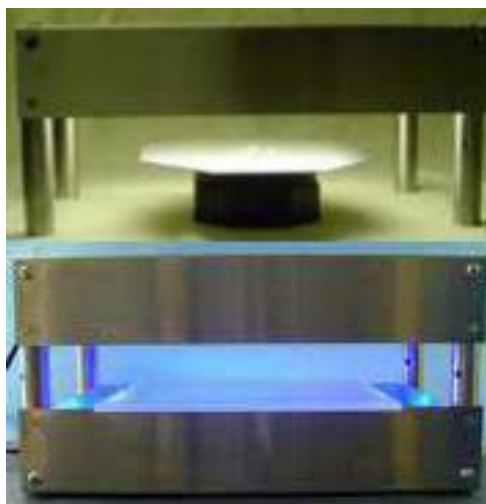
	<h3>An ICH primer</h3> <p>Referred to simply as the ICH guidelines, this document was prepared by the International Conference on Harmonization of Technical Requirements of Pharmaceuticals for Human Use. The US Food and Drug Administration in the Federal Register published "Guidelines for the Photostability Testing of New Drug Substances and Products" on May 16, 1997 (p. 27 116). The Guidelines recommend illumination delivering 1.2 million lux hours including 200 Watts per square meter in the UVA region. Two types of lamps are acceptable: xenon lamps (Option 1) and fluorescent tubes (Option 2). Users "may rely on the spectral distribution specification of the light source manufacturer." Luzchem's compliant information is supplied with ICH1 and ICH2 photoreactors.</p>
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EXPO Panels

Ultraviolet and visible exposure flexibility



Expo panels are a cost effective and flexible solution for ultraviolet and visible irradiation, specially designed for customers with unique needs. Each Expo panel (8 x 16 x 3 inches) uses five fluorescent lamps providing an emissive area of approximately 7 x 12 inches. All Luzchem or Rayonet 8 watt fluorescent lamps can be used, including UVA, UVB, UVC (requires proper ventilation, such as a fumehood), Visible and 420 nm. Panels are supplied with a pair of UV-absorbing safety goggles. The UV-Shield is a recommended safety accessory. Expo panels allow virtually infinite design flexibility. Use one panel for ultraviolet curing applications, or to irradiate biological samples in Petri dishes. Alternatively, use multiple panels to expose a conveyor belt, or transform an incubator into a photoreactor, or refinish a separate room into an ultraviolet exposure room. Each expo panel has building cubes with 1/4-20 threads in its four corners, allowing multiple configurations, some of which are pictured below.



Safety

Safety goggles: UV protecting **safety goggles** with >400 nm cut-off.

Order: LZC-SG

Order: LZC-SG5 for a 5 pack



UV-Shield for use with Expo Panels and other products. Filters harmful UV radiation from UVA, UVB or UVC lamps.

Order: **UV-SHIELD**

Luzchem offers a range of options including external shut down timers (LZC-TIM_E), acrylic UV shielding panels and interconnection kits. Photoreactor tools, such as, well plate stirrers, power meters, spectroradiometers and portable options, such as merry-go-rounds, (see page 12) can also be used with expo panels.

Photoreactor options

Environmental chambers



True exposure control: Temperature, wavelength and atmosphere

Takes substrates up to 8.3 in (21 cm) in diameter and up to 1 inch (2.5 cm) deep. Fits in all Luzchem photoreactors. Inert gas and suction ports and temperature control up to 180°C. Upper limit factory programmable.

Our chamber offers unique flexibility with excellent temperature control, and the possibility of flowing the non-flammable gas of your choice. The cover serves as a cut-off filter. Suction port improves thermal contact for lithographic users.

Order: **LZC-ECDH** Closed unit
LZC-BK Open unit, temperature control only
LZC-ECDH_Py Pyrex cover
LZC-ECDH-Q Fused silica cover

Factory Installed Options

Digital Temperature monitor - Adds a valuable feature to most photoreactors. Monitors the temperature of air flow exiting the chamber. Normally set in Celsius degrees.

Order: LZC-TEM



Installed motor drive - Motor to drive carousel and turntable. Adjustable speed.

Order: LZC-A



Carousel* - Holds up to 16 tubes. Can not be used at the same time as the turntable or magnetic stirrer.

Order: LZC-B

Turntable* - For solid samples, Petri dishes or well plates. Can not be used at the same time as the carousel or magnetic stirrer

Order: LZC-C.



Recessed magnetic stirrer* - Adjustable speed can add convenience for synthetic work and for stress tests. Can not be used at the same time as the turntable or carousel.

Order: LZC-D

Digital Timer - Allows timing from a few seconds to 99 hours. Automatically shuts off the unit upon completion of the irradiation.

Order: LZC-TIM



* Glassware and well plates sold separately

Add-Ons

Power meter for use with LZC-UVA lamps and any visible lamp. It is calibrated both at 350 nm and in the visible region. An inexpensive monitor for UVA with $\pm 25\%$ accuracy (for use with LZC-UVA only) and visible light output with $\pm 10\%$ accuracy.

Order: LZC-PM



Well Plate Environmental Chamber* with adjustable stirring rate supplied with Pyrex cover. Perfect for exposing samples under nitrogen during irradiation.

Order: WP-01

Also Available

Replacement Pyrex cover for WP-01

Order: WP-PC



Quartz cover for WP-01

Order: WP-QC

Portable Options

Carousel* for up to 16 tubes.

Order: LZC-MGR



Turntables* for solid samples or Petri dishes

Order: LZC-TRN

Portable 12 V DC magnetic stirrer* Designed for 110V. For 220 V a transformer is required. Up to four portable units fit in the photoreactor chamber.

Order: LZC-MGS



External digital countdown timer.

Compatible with several products; enables any electrical equipment (110 V or 220 V) to shutdown after prescribed time.

Order: LZC-TIM-E



* Glassware and well plates sold separately

Photoreactor lamps and filters

Luzchem uses T5 type lamps. They are fully interchangeable in all Luzchem photoreactors (except xenon photoreactors) and with many Rayonet systems.

Part No	Description
LZC-UVA	UVA lamp centered at ~350 nm
LZC-UVB	UVB lamp centered at ~300 nm, with a peak at 313 nm
LZC-UVC	UVC germicidal lamp with a strong line at 254 nm. Note: Use requires proper ventilation
LZC-420	Lamp centered at ~420 nm
LZC-VIS	Cool white fluorescent tubes. Ideal for emulation of office light and for ICH compliance
LZC-RED	Red filter sleeve cuts off at 600 nm. Normally used with VIS
LZC-540	Amber filter sleeve for VIS bulb. Cuts out light below 540 nm.

Quartz Labware

Luzchem Labware is ideal for synthetic or photostability work. Made of commercial quartz with excellent transmittance above 230 nm. Many sizes and accessories are available.



Description	Volume	Order
Erlenmeyer with 24/40 joint	100 ml	QL-EFJ100
Erlenmeyer with 24/40 joint	250 ml	QL-EFJ250
Flask with 24/40 joint (flat bottom)	100 ml	QL-BFJ100
Flask with 24/40 joint (flat bottom)	250 ml	QL-BFJ250
Flask with 24/40 joint (flat bottom)	500 ml	QL-BFJ500
Quartz tubes 14 mm OD, 12 mm ID, 100 mm long approximate capacity 10 ml. 8 pack or 50 pack.	10 ml	Q-TUBES Q-TUBES_50

Pyrex Supplies

Ideal for use where transmittance below 320 nm is not required.

Pack of 16 Pyrex tubes 14 mm OD, 12 mm ID, 100 mm long, ideal for Luzchem carousels	10 ml	P-TUBES
Pack of 16 replacement screw caps for P-TUBES	N/A	P-CAPS

Luzchem's Patented Laser Flash Photolysis system

What is different about Luzchem's LFP systems?

- Patented: U.S. Patent No. 6,741,347 and UK patent No. 2,358,244
- Small footprint makes it portable
- Powerful ceramic xenon lamp allows efficient fiber coupling and instrument miniaturization
- Lamp pulsing is unnecessary and the system is air cooled
- Time scales available start at a few nanoseconds, but extend to seconds
- Other advantages of the use of a CW lamp include longer lamp life-time, better signal baselines, and a more linear detector behaviour.
- Synchronization with the laser is always perfect and jitter free, it is so advanced that the system performs well even with no physical connection between laser and LFP instrument
- Powerful software allows full control and optimization of operating parameters

Standard components in all systems

- Ceramic xenon light source
- 125 mm monochromator
- Tektronix digitizer (Model varies)
- Compact photo multiplier
- Power supply
- Cell holder
- Fiber optic connectors
- Desktop or notebook computer
- Fiber optic sensor for laser sensing pre-trigger signal
- Computer interfaces and software
- Pre-configured spectral range (factory set)



Note: Luzchem LFP systems do not include the laser.

What else do you need to do flash photolysis?

- a nanosecond laser (ask us for advice)
- a safe exhaust for traces of ozone from the xenon lamp

LFP models

Transient Absorption

Complete laser flash photolysis system. For spectroscopic and kinetic absorption measurements. Luzchem's LFP can generate a 5 volt trigger pulse suitable for most lasers, including the two pulse sequence required for YAG lasers (flash lamps and Q-switch) with programmable frequency and delay.

LFP-111 series

Developed for spectroscopic and kinetic laser flash photolysis measurements. The LFP-111 series includes all standard components plus a temperature monitor and amplifier. Uses a Tektronix TDS 3000 series digitizer (300 MHz bandwidth).

Model	Range	Notes
LFP-111_UV	200-780 nm	Requires exhaust for trace ozone
LFP-111_RED	300-880 nm	Requires exhaust for trace ozone
LFP-111_OF	330-880 nm	Uses an Ozone Free Lamp

LFP-212 series

Includes all standard components (Tektronix digitizer - TDS2000 series with 100 MHz bandwidth). Connects through a USB connection.

Model	Range	Notes
LFP-212_UV	200-780 nm	Requires exhaust for trace ozone
LFP-212_RED	300-880 nm	Requires exhaust for trace ozone
LFP-212_OF	330-880 nm	Uses an Ozone Free Lamp

Diffuse Reflectance

Model LFP-222

Laser photolysis transient diffuse reflectance spectrometer for spectroscopic and kinetic absorption measurements. Includes all standard components and a Tektronix digitizer TDS-2000 series with 100 MHz bandwidth. Connects through a USB connection.

Dual Capability: Transient Absorption & Diffuse Reflectance

Model LFP-212/222

Dual Capability: Laser photolysis transient absorption and diffuse reflectance spectrometer for spectroscopic and kinetic laser flash photolysis measurements. Includes: all standard components, a Tektronix TDS-2000 series digitizer with 100 MHz bandwidth and a second ceramic xenon light source dedicated to diffuse reflectance.

LFP-111 specifications

Footprint:

12 x 18 inches (30 x 45 cm)

Time response and time scales:

Detector ~5 ns rise time

Digitizer 300 MHz (2.5 GHz sampling)

Long time scales: lifetimes of hundreds of milliseconds, even seconds, readily performed.

Spectral Range:

Variable depending on the grating selected by customer. With recommended grating: 230-750 nm. Amplifier can be used to extend this region.

Sample Holder:

For ambient temperature studies. Holds 10 x 10 mm cells.

Light Source:

Ceramic 300 W xenon lamp coupled to fiber optic cables.

Triggering:

Optically synchronized

Amplifier:

For signals with lifetimes over 40 ns.

Temperature monitor:

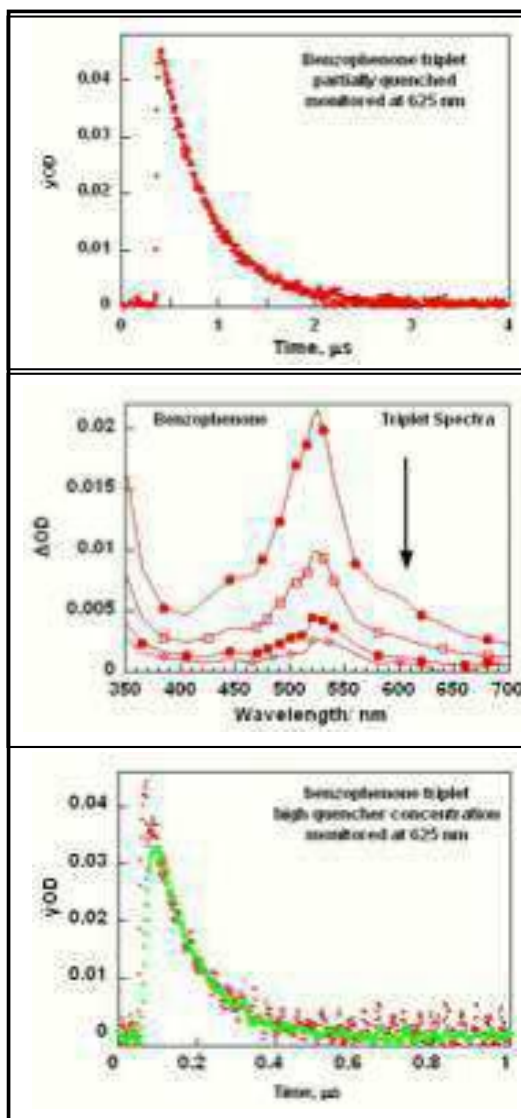
A semiconductor chip monitors the temperature in the sample compartment.

Computer interfacing:

The LFP-111 and digitizer are connected to the computer via GPIB and serial interfaces (supplied) that control all experimental parameters.

Computer and software:

Supplied with a computer using Windows OS and all the necessary interfaces. The software package has been developed in the LabVIEW environment. Data from the LFP-111 can be easily exported in ASCII format to meet your requirements.



LFP-111 detection platform

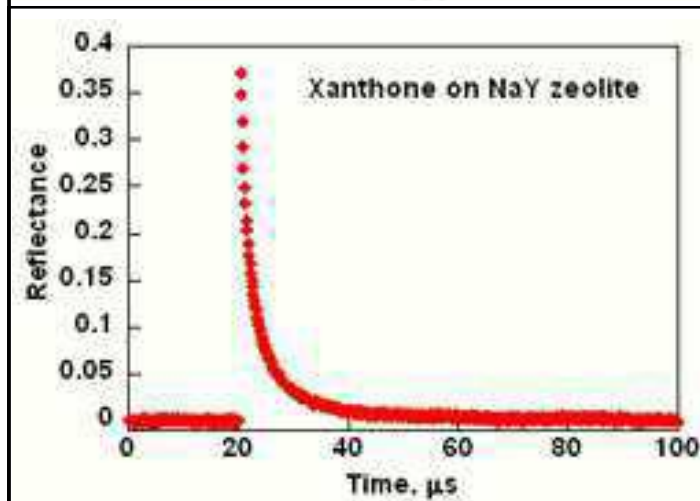
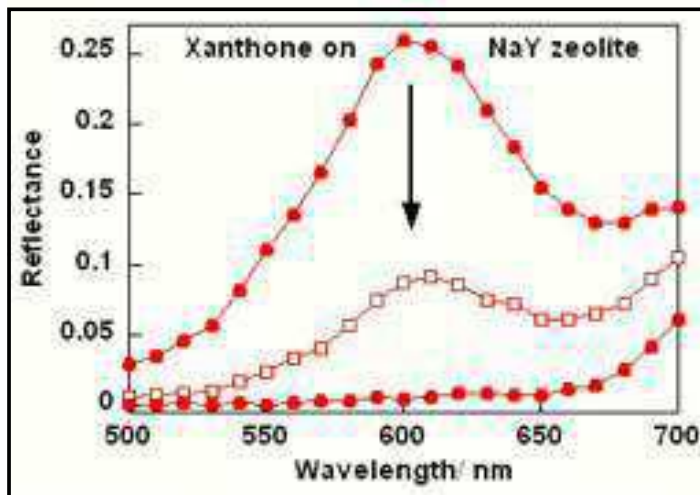
Time resolved diffuse reflectance

Luzchem's LFP-222 is capable of time resolved diffuse reflectance detection allowing the use of laser flash photolysis for the study of opaque, light scattering samples.

Luzchem's diffuse reflectance is available as a stand-alone technique or in a combination with transmittance laser flash photolysis systems. The optical system has been designed to maximize the solid angle for signal collection and affords exceptional signal quality.

In the example included in this page: 3 mJ pulse at 337 nm was used to excite xanthone (3%) on silica gel to achieve a 24% reduction in reflected light, due to the xanthone triplet state, an exceptional signal for such low excitation power.

Uses 3 x 7 cells.
Order: SC-37S



LFP options

ADD ON OPTIONS

Amplifier for all transient absorption models. Now standard on all LFP-111 series. Highly recommended for LFP-212 series. Amplifies PMT output for signals with lifetimes 40 ns and longer. Allows expansion of spectral detection range. Can be used by customers wishing to upgrade an older LFP.

Order: LFP-AMP

Recommended maintenance kit. Includes two xenon lamps, one shutter blade, one 1000 micron light delivery fiber, one laser trigger fiber replacement, one replacement temperature sensor and various fuses.

Order: LFP-MAIN

Temperature monitor: includes sensor, interface and software to read/record temperature. Standard with LFP-111 series.

Order: LFP-TMO

Optical Filters

Hot filter transmitting only visible light (400-720 nm), 25 mm diameter, suitable for use with Luzchem or Cermox xenon illuminators or by itself (includes clip for lamp mounting)	XE-HF
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Optical Accessories

Shutter for laser and lamp beams: Operated with 12 volts DC*, this simple shutter offers convenience in a durable product. It can be provided with a black anodized or scattering clean aluminium blade and either with or without a breadboard mounting plate.



Description	Part Number
For complete shutter*	OA-LS-T
For shutter without breadboard mounting bracket*	OA-LS-W
Replacement blade for shutters (black)*	OA-SBB
Replacement blade for shutters (reflecting) *	OA-SBR

* Power supply not included

Xenon Illuminators

Cost effective and powerful xenon illumination

300 W xenon source (LUZ-XE300)



Luzchem's xenon illuminator uses state of the art ceramic lamp technology to achieve a 34 Watt radiant output (300 W bulb). This Self-contained, air-cooled unit has three versions: (a) full UV spectrum, (b) filtered (cut off at 320 nm) ozone free, and (c) hot filtered allowing only the visible region. We also offer collimated or focused output, the latter being ideal for fiber optic coupling. Changing the lamp and housing from focused to collimated output only takes a few moments.

Please specify your lamp needs at the time of order.

Model **LUZ-XE300** incorporates built-in shutter controlled either manually or by a computer generated TTL level. Shutter prevents burning of fiber end when used with a focused lamp and fiber optic coupling.

Cermax 300 W Xenon Lamps



Note: Part # refers to xenon bulbs only.
 Standard replacement part for LFP-111 is LFP-XE_300
 Expected Lifetime: 1000 hours. Warranty: 500 hours.

Xenon bulbs & Housings	Parallel	Focused
Full UV output	XE300BUV	LFP-XE_300
Ozone free	XE300BF	XE300B-10F
Housing (lamp sold separately)	HOUSING-P	HOUSING-F

Lamp housing includes heat sink necessary for heat dissipation. Allows the user to efficiently alternate between two different lamps when necessary. Housings for parallel and focused lamps are not interchangeable.



Xenon Illuminator Accessories

Part No.	Description	Thorlabs Compatible
XE-F	Fiber optic coupling	N/A
XE-L	Stackable Lens/filter holder for 1 inch round lenses	Yes
XE-R	Lens retaining ring	Yes
XE-FH	Filter holder for 2 inch square filters	Yes
XE-KIT	Includes 2 lens/filter holders (XE-L), 1 filter holder (XE-FH) and one fiber optic coupling (XE-F), 1 lens retaining ring (XE-R), 5 extra placement screws	See above

Fibers

Silica fiber: We can make SMA fiber patch cables to meet your needs. Contact Luzchem for details on custom needs. Below are our standard fibers:

Table of 1000 micron monitoring fibers with SMA connectors.

Fiber Length	Part number	Notes
5 meters	LFP-MF_5	Blue Jacket
2 meters	LFP-MF_2	Blue Jacket
1 meter	LFP-MF_1	Blue Jacket
0.5 meter	LFP-MF_H	Blue Jacket



Table of Spectroradiometer fibers.

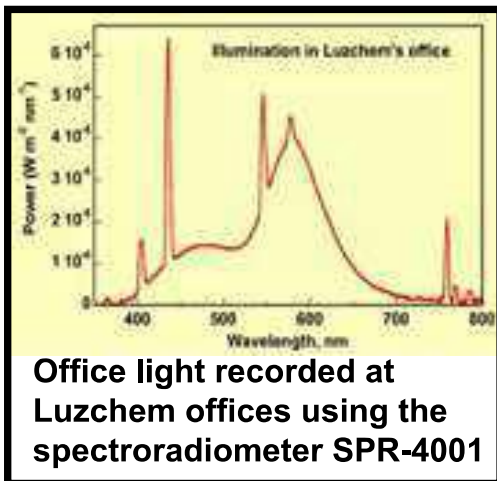
Part number	Notes
SPR-F01	Replacement Fiber SPR-4001
SPR-F02	Replacement Fiber SPR-4002
SPR-F03	Replacement Fiber SPR-03
SPR-UF01	Upgrade Fiber - Steel Jacket - 2 meters long.

UV-Visible Spectroradiometer

Luzchem's Spectroradiometers are suitable for a wide range of applications including photobiology research, drug photostability testing, environmental dosimetry and curing applications. These NIST-traceable instruments monitor the 235-850 nm or 230-1050 nm regions. Data are based on a 3640 or 4096 element diode array detector, an integrating acquisition detector with fiber optic connectivity, easy to use LabVIEW software and a convenient USB interface.



SPR-4001



Luzchem's spectroradiometers allow for variable integration times, from 1 ms to one minute. Data can be displayed as raw intensity or as a power spectrum ($\text{mW m}^{-2} \text{nm}^{-1}$), using either the NIST-traceable calibration provided, or a user-generated calibration file. This display includes graphic data as well as integrated spectral ranges, UVA, UVB, UVC, visible and a user selected spectral window. In the timed acquisition mode the SPR-4001. SPR-4002 and SPR-03 display real-time data and store full spectra at user-selected intervals. Data are easily exported to common spreadsheet or graphical applications. A powerful and affordable tool.

	SPR-4001	SPR-4002	SPR-03
Spectral Range	235-850 nm	235-850 nm	235-1050 nm
Power Requirements	2 AA batteries for verification lamp	none	2 AA batteries for verification lamp
Power source	Uses 5 volts supplied by USB interface for power		
Interface	USB	USB	USB
Detector	3648 element CCD detector with 600 lines/ mm grating blazed at 400 nm, including order sorting filter		4096 element CCD detector
Data output	At 1 nm intervals		
Data logging	From 1/10 of a second to days		
Data export	Tab separated ASCII, fully compatible with Excel and other graphical and spread sheet programs		
Resolution	Approximately 1 nm		
Verification	Low pressure mercury lamp	none	Low pressure mercury lamp

Part #	Description
SPR-4001	NIST-traceable spectroradiometer measures power distribution in the 235-850 nm region. A built-in verification lamp allows for rapid end-user check of the wavelength calibration. Allows for variable integration times from 1 ms to 60 seconds. Acquire and save data at user-selectable intervals. Compact detector head on a 1 meter fiber connector can reach tight spots.
SPR-4002	NIST-traceable spectroradiometer measures power distribution in the 235-850 nm region. Allows for variable integration times from 1 ms to 60 seconds. Acquire and save data at user-selectable intervals. Robust self-contained unit with built-in detector head.
SPR-03	Measures power distribution in the 235-1050 nm region. Includes a built-in verification lamp. Allows for variable integration times from 1 ms to 60 seconds. Acquire and save data at user-selectable intervals. User friendly Labview software. USB interface. Compact detector head on a 1 meter fiber connector can reach tight spots.
SPR-CAtt	Calibrated PTFE attenuator. New calibration file provided (does not affect the Luzchem supplied calibration)
SPR-UAtt	Uncalibrated PTFE attenuator (50 x 50 mm)

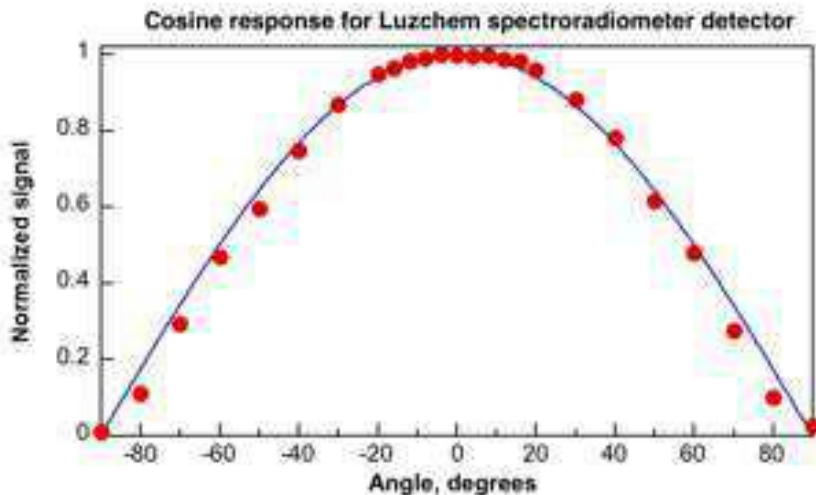
Luzchem offers spectroradiometer calibration services. Recalibration is recommended every 12 months for compliant applications or every 18 months for others.

COSINE DEPENDENCE



A good integrator for spectroradiometry must follow a cosine dependence with the angle of incidence of light on the detector. The angle of interest measures the deviation from normal incidence. Luzchem Spectroradiometers have exceptional performance, even for angles near 90 degrees. In the figure below, the normalized signal corresponds to the integrated flux between 400 and 700 nm and the blue line is the expected theoretical response.

The cosine dependence was measured using a NIST-traceable 200 Watt QTH calibration lamp.



Quartz spectroscopy supplies

Cost effective cells: a great solution for laser flash photolysis, diffuse reflectance and fluorescence.

A Spectrometer cuvettes designed for laser photolysis work, but suitable for most types of spectroscopy, including fluorescence and NIR work. The optical path has a tolerance of 2% and the walls are 0.9 mm thick for 10 mm cells and 0.7 mm thick for 7 mm cells. A low cost option for spectroscopic studies where 2 % fluctuations in optical path are not critical. Ideal for use under inert atmospheres.

Size, mm	Length, mm	Top	Part No
10 x 10	130	7 mm tube	SC-10L
10 x 10	80	7 mm tube	SC-10S
7 x 7	130	7 mm tube	SC-07L
3 x 7	80	7 mm tube	SC-37S*



*Recommended for time resolved diffuse reflectance

Precision UV quality fused silica spectroscopy cells



B Made of UV quality fused silica, with flat windows and less than 0.2% tolerance. Ideal for demanding fluorescence and absorbance work, including DNA studies. Excellent optical properties down to 190 nm. The optical range is 190 nm 2.5 micron. Selected units are listed below. For a complete list see www.luzchem.com/products/spectroscopy.html.

Part No	Size, mm	Description
SSC-01-4	10 x 10	Standard cell with lid.
SSC-01-14	10 x 10	Absorbance cell with teflon stopper.
SSC-01-104	10 x 10	Standard cell with round bottom and lid
SSC-01-204	10 x 10	Standard fluorometer cell with 4 optical windows & lid
SSC-01-214	10 x 10	Fluorescence 10 x 10 mm cuvettes with four optical windows and teflon stopper
SSC-01-404	10 x 10	Standard cell with stopper and level bottom

Luzchem

Shedding light on new ideas

Areas of application

Photochemistry
Photobiology
Drug photostability
UV curing
Ultraviolet disinfection
Time resolved spectroscopy
Kinetics and mechanisms
Reactive intermediates
Nanostructures
Coatings
Radiometry
Solar simulation



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