

S2 High-OH Synthetic Quartz Tube

Specification Datasheet · TopRays Quartz Materials

S2-series synthetic fused silica is produced with a unique, environmentally friendly fusion process, offering very high purity and excellent visual quality. It is a fused silica glass with high transmittance, performing well in high-energy and deep-UV applications. The S2 series is free of bubbles and inclusions; its ultra-high purity gives excellent optical transmission across the deep-UV and visible bands, with an effective wavelength range extending from below 180 nm to 2000 nm.



Application Scenarios

In addition, its high-temperature and thermal-shock resistance means it is often used as a substrate for optical components with extremely demanding stability requirements, or as a specialty part.

Application field	Specific application scenarios	Key advantages
Semiconductor and microlithography	Lenses and photomask substrates in lithography equipment.	This is its most critical application. At the 193 nm (ArF) and 248 nm (KrF) excimer laser wavelengths, the material requires extremely high transmittance, very low absorption, excellent optical homogeneity and laser-damage resistance to ensure chip-process precision and long lens life.
High-energy lasers and optical systems	Optical components (such as windows and lenses) for excimer and high-power lasers, and components in beam-delivery systems.	The material withstands high-energy laser radiation and does not heat up or deform from absorbing laser energy, preserving beam quality.
Precision analysis and spectroscopy	Cuvettes and optical windows in spectrophotometers and key parts of spectrometers.	Broadband high transmittance from deep UV to near infrared makes it an ideal window material for precision optical analysis.
Emerging technologies	Deep-UV photochemical microreactor chips and high-precision microfluidic devices.	For example, scientists used its deep-UV transmittance to fabricate three-dimensional microreactor chips for efficient synthesis of drugs such as vitamin D3, solving the absorption and thermal-management problems of conventional equipment under UV light.
Telecom and specialty fiber	Core or cladding material for high-performance, light-guiding and specialty fibers.	Very low signal loss and stable optical performance underpin its use in fiber communications.

Appearance Parameters

Striae	Functional direction grade 5 (ISO 10110-4)
Birefringence / residual stress ¹	≤ 5 nm/cm (typical)
Bubbles	Bubble grade (DIN 58927) 0
Maximum number of inclusions ²	0
Fluorescence ³	None (excited at 254 nm)

Notes

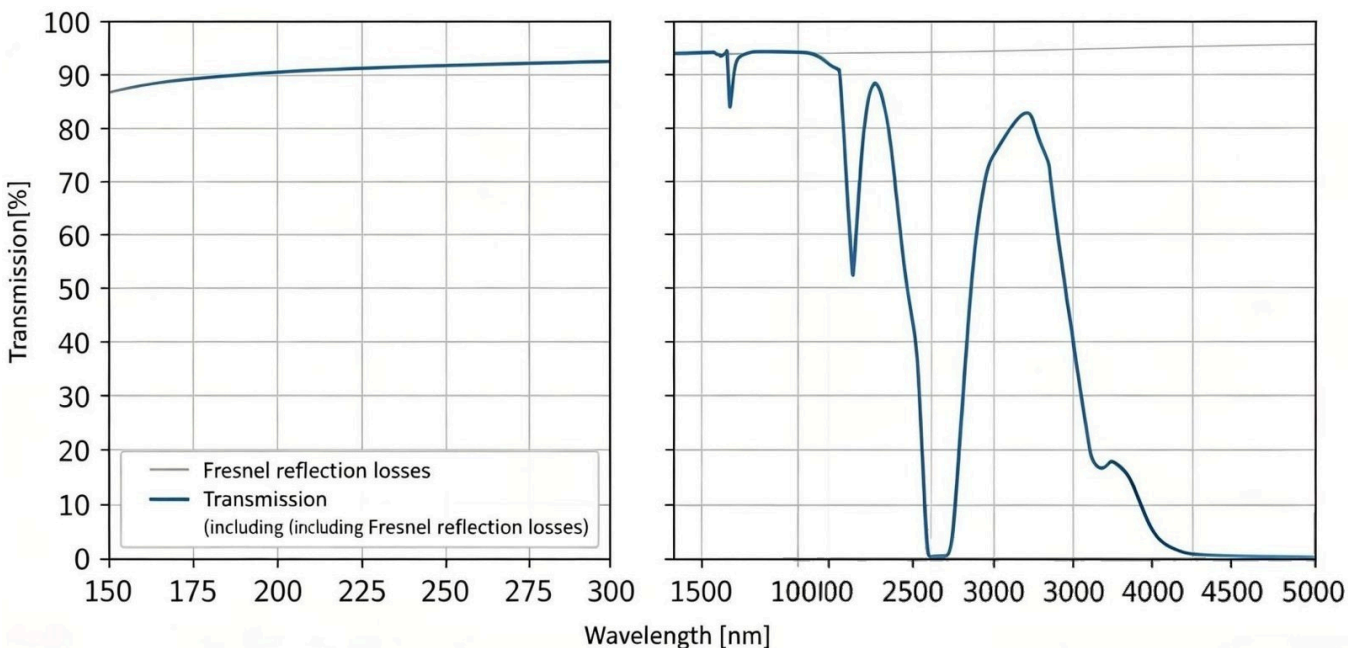
¹ Stress-induced birefringence applies to an ingot diameter of 80% or a machined-part diameter of 90%.

² Bubbles and inclusions ≤ 80 μm in size are not counted. Products free of inclusions down to 10 μm are available on request.

³ Excitation source: Hg lamp, λ = 254 nm, UQ 5 filter; lamp power: 8 W; detection method: adapted to the human eye.

Optical Characteristics

Wavelength	Transmittance
λ = 193.4 nm	> 98.5%
λ = 248 nm	> 99.5%



Typical Chemical Composition

Hydroxyl (OH) content
~1000-1350 ppm

Chemical properties	Element	Al	Ca	Cr	Cu	Fe	K	Li	Mg	Na	Ti	V
	Content	<5	<5	<1	<1	<50	<10	<5	<5	<10	<5	<1

(Unit: ppm, i.e. µg/g)

Technical Performance

Other properties	Thermal properties
Abbe number: 67.8	Strain point*: 1025 °C
Density: 2.2 g/cm³	Annealing point*: 1120 °C
Hardness: 5.5 ... 6.5 (Mohs)	Softening point*: 1600 °C
	Coefficient of thermal expansion: 0.54×10^{-6} (average, K ⁻¹ , 0 ... 600 °C)

* These values may vary with the thermal history of the glass.