

Institute for Photonics &
Advanced Sensing (IPAS)



Tellurite Glass

Optofab Adelaide specialises in producing high-quality tellurite glass for high nonlinearity applications (e.g. supercontinuum generation) and laser applications. The glasses are melted under a controlled atmosphere to ensure high-purity and low water content. There is a range of glass compositions for different applications on request including TZNL, TZN and TN. Tellurite glass has a wide transmission range of 0.4 to 4.0µm.

Optofab Adelaide can produce undoped or rare-earth doped tellurite glass blocks of up to 50mL (300g). This glass is also available in a range of extruded preforms and optical fibre with desired structure. Rare earth iron dopants include: Erbium, Holmium and Thulium (others on request). For pricing and availability, please contact [Luis Lima-Marques](#).



OPTOFAB ADELAIDE

Optofab facilities in Adelaide specialises in optical fibre, glass and functional optical materials production. The range of key services offered include:

- Soft glass fabrication
- Soft and hard glass and polymer preform extrusion
- Soft glass fibre drawing, including microstructured fibres
- Silica fibre drawing, including microstructured fibres
- Glass characterisations (ellipsometer, optical profiler, UV-Vis-NIR spectrophotometer, STA/FTIR)
- Surface functionalisation of glasses and fibres
- DMG DMU-20 Linear Ultrasonic, 5-axis milling machine with ultrasonic milling capability for machining of glass, ceramics and metals
- 3D printing - metals and ceramics
- MicroVu Vertex 312UC LWD Vision System Coordinate Measuring Machine (CMM)

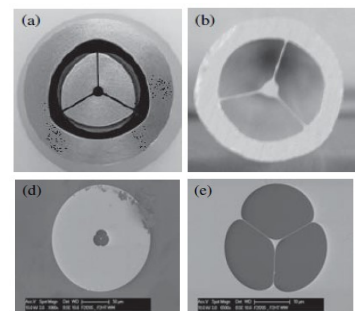
PROPERTIES		TZN	TZNL
Optical	Transmission Range (cm scale)	0.4 ~ 4 µm	0.4 ~ 4 µm
	Refractive Index (n_{1550nm})	1.97	1.98
Thermal	Glass transition temperature (T_g)	293°C	315°C
	Thermal expansion (α)	$18.8 \times 10^{-6}/^{\circ}C$	$17 \times 10^{-6}/^{\circ}C$
Physical	Density (d)	5.15g/cm ³	5.35g/cm ³

COMPOSITION (mol%)

TZNL: 73TeO₂ - 20ZnO - 5Na₂O - 2La₂O

TZN: 75TeO₂ - 15ZnO - 10Na₂O

TN: 75TeO₂ - 25Na₂O



(a) stainless steel die exit used for the extrusion of the structured preform (b) the extruded structured (d) SEM images of the fabricated fiber cross-section, (e) enlarged SEM image of the fiber's core and cladding*

M.R. Oermann, H. Ebendorff-Heidepriem, Y. Li, T.-C. Foo, T.M. Monroe, "Index matching between passive and active tellurite glasses for use in microstructured fiber lasers: Erbium doped lanthanum-tellurite glass", *Optics Express* 17 (18), 15578-15584, August 2009.

Manning, S., Ebendorff-Heidepriem, H. and Monroe, T.M., 2012. Ternary tellurite glasses for the fabrication of nonlinear optical fibres. *Optical Materials Express*, 2(2), pp.140-152.

Guangming Tao, Heike Ebendorff-Heidepriem, Alexander M. Stolyarov, Sylvain Danto, John V. Badding, Yoel Fink, John Ballato, and Ayman F. Abouraddy, "Infrared fibers," *Adv. Opt. Photon.* 7, 379-458 (2015).

*Oermann, M.R., Ebendorff-Heidepriem, H., Ottaway, D.J., Lancaster, D.G., Veitch, P.J. and Monroe, T.M., 2012. Extruded microstructured fiber lasers. *IEEE Photonics Technology Letters*, 24(7), pp.578-580.

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