



CRYSTAL SUBSTRATES



Product Overview

A BOND WORTH FORMING

WE ENABLE INNOVATION

For over 30 years we've been enabling you to accelerate your research and development, proudly partnering with the most innovative minds in the science and technology sectors.

We're purpose designed to support your science and technology innovation, and take your ideas from lab-based concepts to full-scale production.

With our capabilities and extensive expertise we're the partner of choice for custom manufacturing solutions and niche product sourcing through our trusted network of UK and international suppliers.

Specialising in the following areas:

- Energy Research
- Hydrogen Technology
- Photonics + Optoelectronics
- Thin Films + Nanotech
- Materials Processing + Testing
- RF Shielding
- Electroforming
- Specialist Metallic Coatings

Accelerate your journey. We are PI-KEM.

MICRO-INFO

- 30+ years supplying advanced materials and equipment
- Custom manufactured components
- Niche product sourcing
- Comprehensive range of standard stock products and consumables
- Call off purchase options
- Support from an expert scientific team
- Low minimum order quantity
- UK, European & global delivery

We offer a wide range of advanced materials and equipment which are available as standard or custom manufacture.

Within this catalogue are our most requested lines, however we welcome any enquiry for other specifications.

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Crystal Substrates

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Our single crystal supplier SurfaceNet was founded in 2003 by Dipl.-Ing. Peter Droste, who has over 40 years of experience in crystal growth and crystal processing.

SurfaceNet can provide a wide range of substrates, from simple sapphire and quartz to specially grown crystals with custom dopants and orientations. With constant equipment updates, they are specialists in producing unique and never-before-seen crystals.

Their production facility extends over 720 m² and enables them to manage every aspect of substrate manufacturing, from growing crystals to orientating, cutting, polishing and packaging substrates.

In addition to crystal products, SurfaceNet also manufacture speciality chemicals and targets according to customer requirements.

As SurfaceNet's UK & Ireland Distributor, PI-KEM has been a trusted partner for over 20 years.

Their extensive experience in crystal growth, production, and manufacturing, allows them to offer a wide range of high-quality single-crystal products for the electronics, energy and optics sector.

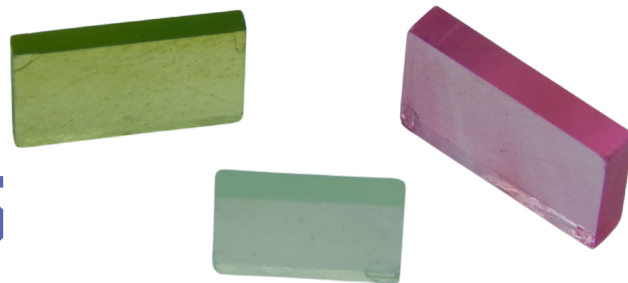
If you have any upcoming substrate requirements or would like more information, please contact our expert team.

Our Partners

We distribute on behalf of leading manufacturers of advanced materials & equipment



CRYSTAL SUBSTRATES



PI-KEM offer a range of single crystals and substrates, both standard and custom grown.

Single crystals can be supplied as the following:

- Custom sizes and shapes
- Standard wafer sizes, eg. 2", 3" or substrates (sizes 5mm x 5mm or 10mm x 10mm)
- Standard orientations, as well as custom mis-cuts and tolerances
- Single or double side polished surface finish, to standard or custom surface roughnesses

We welcome any enquiry for other specifications

Materials Available:

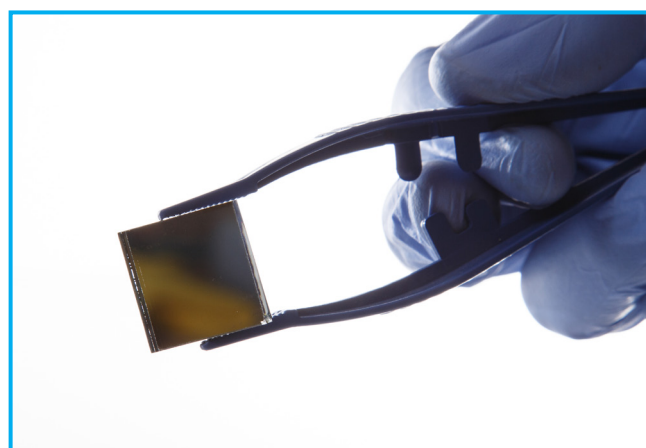
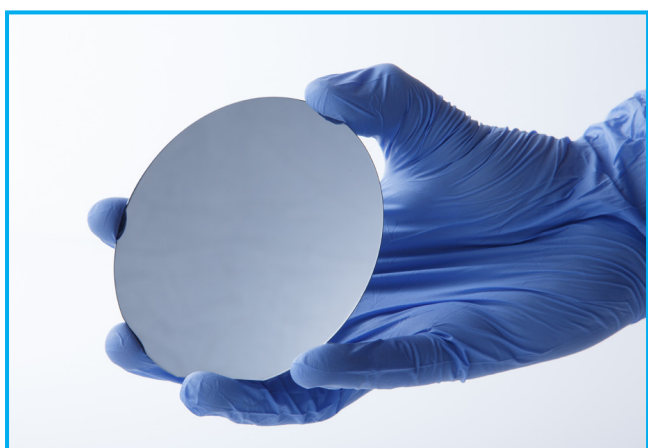
- Metal Single Crystals
- Oxides
- Titanates
- Niobates
- Gallates
- Aluminates
- Doped Crystals
- Bi-crystals

Specifications Available:

- Purity
- Doped or undoped
- Orientation

Structure:

- As cut
- Polished
- To required Orientation and Size
- Vicinal Substrates
- Boules, wafers, tiles, prisms, optical components and rods



Single crystal substrates are fundamental materials for semiconductor and electronic devices due to their unique physical and electrical properties.

These include:

- **Monocrystalline structure:** Give uniform crystal orientation with no grain boundaries
- **High electron mobility:** Allows faster signal processing and device operation
- **High mechanical strength:** Less likely to deform or fracture
- **Enhanced thermal conductivity:** Dissipate heat efficiently
- **Optical Transparency:** In materials including sapphire and silicon carbide making them suitable for use in optical devices and sensors
- **Uniform doping characteristics**



They serve as the foundation upon which electronic circuits are built, enabling the development of high-performance devices with enhanced capabilities.

Examples of applications are:

- Integrated circuits
- Power electronics
- Optical devices
- Sensors and detectors
- High-frequency devices

PI-KEM offer a range of substrate and wafer storage options:

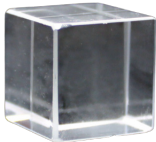
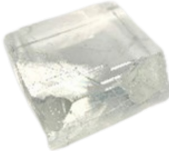
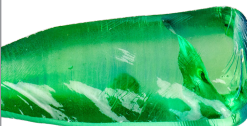
- Individual wafer carriers (sizes available 2" - 8")
- Cassettes (sizes available 2" - 8")
- IC trays
- Membrane boxes

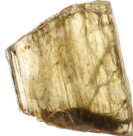
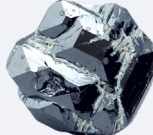


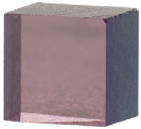
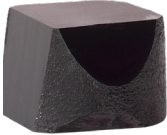
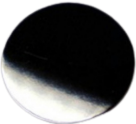
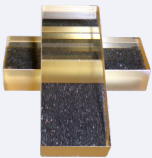
CRYSTAL SUBSTRATES



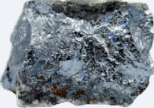
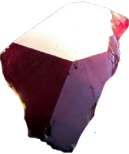
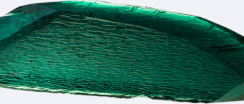
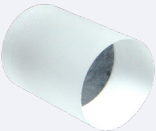
Here are a selection of the materials our substrates can be produced from.

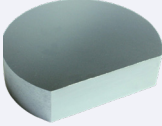
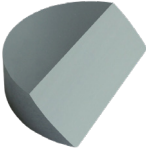
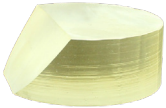
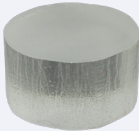
	Substrate	Formula
	Alexandrite	$\text{BeAl}_2\text{O}_4:\text{Cr}^{3+}$
	Aluminium Oxide (Sapphire)	Al_2O_3
	Aluminium Oxide Magnesium Oxide (Spinel)	$1 \text{ Al}_2\text{O}_3 * 1 \text{ MgO}$ or $3,5 \text{ Al}_2\text{O}_3 * 1 \text{ MgO}$
	Aluminium Oxide (Chromium Doped)	$\text{Al}_2\text{O}_3:\text{Cr}$
	Aluminium Oxide (Chromium vanadium Doped)	$\text{Al}_2\text{O}_3:\text{CrV}$
	Aluminium Oxide Iron Chromium	$\text{Al}_2\text{O}_3:\text{FeCr}$
	Aluminium Oxide Iron Doped	$\text{Al}_2\text{O}_3:\text{Cr}$
	Aluminium Oxide Titanium Doped	$\text{Al}_2\text{O}_3:\text{Ti}$

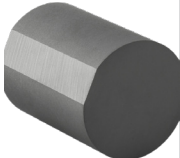
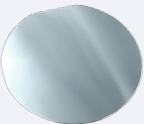
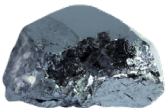
	Substrate	Formula
	Aluminium Oxy Hydroxide	$\text{AlO}(\text{OH})$
	Anatase crystals	TiO_2
	Barium Fluoride	BaF_2
	Barium Titanate	BaTiO_3
	Barium Titanate Ce Doped	$\text{BaTiO}_3:\text{Ce}$
	Barium Titanate Nb Doped 1500ppm	$\text{BaTiO}_3:\text{Nb} - 1500\text{ppm}$
	Barium Zirconate	BaZrO_3
	Bismuth Vanadate	BiVO_4

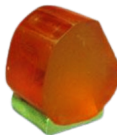
	Substrate	Formula
	Bismuth Ferrite	BiFeO_3
	Beryllium Hexa-Aluminate	$\text{BeAl}_6\text{O}_{10}:\text{Cr}^{3+}$
	Beryllium Aluminate (Chrysoberyll)	BeAl_2O_4
	Beta Barium Borate	$\beta\text{-BaB}_2\text{O}_4$ or BBO
	Bismuth Silicate	BSO
	Bismuth Germanate	BGO
	Cadmium Selenide	CdSe
	Cadmium Sulfide	CdS
	Cadmium Telluride	CdTe
	Cadmium Tungstate	CdWO_4

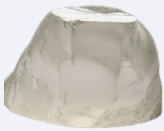
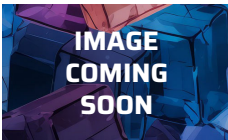
	Substrate	Formula
	Calcium Titanate	CaTiO_3
	Calcium Tungstate	CaWO_4
	Calcium Tungstate Er Doped	$\text{CaWO}_4 : \text{Er}_4$
	Calcium Tungstate Pr Doped	$\text{CaWO}_4 : \text{Pr}$
	Calcium Carbonate Calcite Type	CaCO_3 (Calcite)
	Calcium Carbonate Aragonite type	CaCO_3 (Aragonite)
	Calcium Fluoride	CaF_2
	Calcium Neodymium Aluminate	CaNdAlO_4
	Cassiterite	SnO_2
	Cerium Oxide	CeO_2

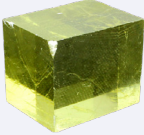
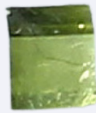
	Substrate	Formula
	Cerium Oxide Calcium Doped	$\text{CeO}_2\text{:Ca}$
	Cobalt Aluminate	CoAl_2O_4
	Cobalt Carbonate (Spherochalite)	CoCO_3
	Cobalt Oxide	CoO
	Cobalt Titanate	$\text{CoTiO}_3 / \text{Co}_2\text{TiO}_4$
	Copper Sulphide	Cu_2S
	Copper Oxide	Cu_2O
	Chrome Oxide	Cr_2O_3
	Dysprosium Scandate	DyScO_3
	Forsterite	Mg_2SiO_4

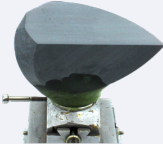
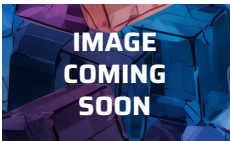
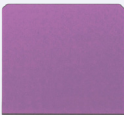
	Substrate	Formula
	Forsterite Chromium Doped	$\text{Mg}_2\text{SiO}_4\text{:Cr}$
	Gadolinium Scandate	GdScO_3
	Gallium Antimonide	GaSb
	Gallium Arsenide (Semi-conducting HB/VB)	GaAs
	Gallium Arsenide (Semi-insulating VB)	GaAs (VB)
	Gallium Gadolinium Garnet	GGG
	Gallium Gadolinium Garnet substituted	SGGG
	Gallium Oxide	Ga_2O_3
	Gallium Phosphide	GaP
	Gallium Scandium Gadolinium Garnet	GSGG

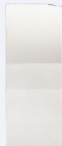
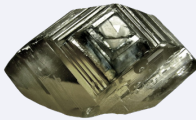
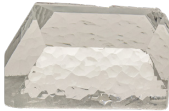
	Substrate	Formula
	Germanium	Ge
	Germanium Antimony Doped	Ge:Sb
	Germanium Gallium Doped	Ge:Ga
	Indium Arsenide	InAs
	Indium Phosphide	InP
	Iron Carbonate	FeCO ₃
	Iron Oxide (Hematite)	Fe ₂ O ₃
	Iron Oxide (Magnetite)	Fe ₃ O ₄
	Iron Hydroxy Oxide	FeOOH
	Iron Sulphide Pyrite type	FeS ₂ (Pyrite)

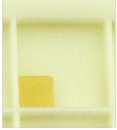
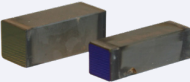
	Substrate	Formula
	Iron Titanate	FeTiO ₃
	Iron Tungstate	FeWO ₄
	Indium Antimonide	InSb
	Langasite	La ₃ Ga ₅ SiO ₁₄ (LGS)
	Langatate	La ₃ Ga _{5.5} Ta _{0.5} O ₁₄ (LGT)
	Lanthanum Aluminate	LaAlO ₃
	Lanthanum Strontium Aluminium Tantalate	LSAT
	Lead Molybdate	PbMoO ₄
	Lead Sulphate	Pb ₂ SO ₄
	Lithium Aluminium Oxide	LiAlO ₂

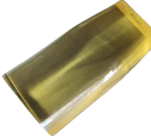
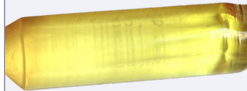
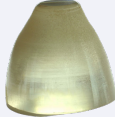
	Substrate	Formula
	Lithium Ferrite	LiFe_5O_8
	Lithium Fluoride	LiF
	Lithium Gallate	LiGaO_2
	Lithium Iodate	LiIO_3
	Lithium Niobate	LiNbO_3
	Lithium Tantalate	LiTaO_3
	Lithium Triborate	LiB_3O_5 LBO
	Magnesium Fluoride	MgF_2
	Magnesium Oxide Boron Doped 200ppm	MgO:B 200ppm
	Magnesium Oxide Chromium Doped 150-15100ppm	MgO:Cr 150-15100ppm

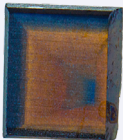
	Substrate	Formula
	Magnesium Oxide Chromium Doped 150-15100ppm	MgO:Cr 1200-9900ppm
	Magnesium Oxide Gadolinium Doped 200ppm	MgO:Gd 200ppm
	Magnesium Oxide Iron Doped 300-12900ppm	MgO:Fe 300-12900ppm
	Magnesium Oxide Iron / Chromium Doped 500-3500ppm	MgO:Fe/Cr 500-300ppm
	Magnesium Oxide Iron / Vanadium Doped 150-300ppm	MgO:Fe/V 150-300ppm
	Magnesium Oxide Manganese Doped 840-3100ppm	MgO:Mn 840-3100ppm
	Magnesium Oxide Nickel Doped 370-5000ppm	MgO:Ni 370-5000ppm
	Magnesium Oxide Scandium Doped 800ppm	MgO:Sc 800ppm
	Magnesium Oxide Titanium Doped 3000ppm	MgO:Ti 3000ppm
	Magnesium Oxide Vanadium Doped 450-15000ppm	MgO:V 450-15000ppm

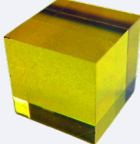
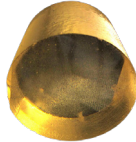
	Substrate	Formula
	Manganese Aluminate	MnAl_2O_4
	Manganese Carbonate (Rhodochrosite)	MnCO_3
	Manganese Oxide	MnO
	Neodymium Doped Yttrium Aluminium Garnet	Nd:YAG
	Neodymium Doped Yttrium Orthovanadate	Nd:YVO ₄
	Neodymium Aluminate	NdAlO_3
	Neodymium Calcium Aluminate	NdCaAlO_4
	Neodymium Gallate	NdGaO_3
	Neodymium Gadolinium Garnet	NGG
	Neodymium Scandate	NdScO_3

	Substrate	Formula
	Nickel Aluminate	NiAl_2O_4
	Nickel Oxide	NiO
	PMN-PT	
	Potassium Bromide	KBr
	Potassium Chloride	KCl
	Potassium Dihydrogen Phosphate	KDP, DKDP or KD*P
	Potassium Niobate	KNbO_3
	Potassium Tantalate	KTaO_3
	Quartz	SiO_2
	Potassium Titanyl Phosphate	KTiOPO ₄ KTP

	Substrate	Formula
	Samarium Scandate	SmScO_3
	Scandium Gallium Garnet	SCGG
	Scandium Yttrium Gallium Garnet	SYGG
	Silicon	Si
	Silicon Carbide	SiC 4 H
	Silicon Carbide	SiC 6 H
	Silicon Dioxide	SiO_2
	Silver Gallium Selenite	AgGaSe_2
	Silver Gallium Sulphide	AgGaS_2
	Sodium Chloride	NaCl

	Substrate	Formula
	Sodium Fluoride	NaF
	Spinell (Co Doped)	$1\text{MgO}_3\text{Al}_2\text{O}_3:\text{Co}$ $\text{MgAl}_2\text{O}_4:\text{Co}_2+$
	Strontium Lanthanum Aluminate	SrLaAlO_4
	Strontium Lanthanum Gallate	SrLaGaO_4
	Strontium Titanate	SrTiO_3
	Strontium Calcium Titanate	$\text{Sr}_x\text{Ca}_y\text{TiO}_3$
	Tellurium Oxide	TeO_2
	Terbium Manganate	TbMnO_3
	Terbium Gallium Garnet	TGG
	Terbium Scandate	TbScO_3

	Substrate	Formula
	Titanium Dioxide Rutile type	TiO ₂ (Rutile)
	Titanium Dioxide Anatase type	TiO ₂ (Anatase)
	Titanium Dioxide Brookite type	TiO ₂ (Brookite)
	Titanium Doped Sapphire	Ti:Sapphire
	Yttrium Aluminium Garnet Chromium Doped	Cr ₄ +:YAG
	Ytterbium Doped Yttrium Aluminium Garnet	Yd:YAG
	Ytterbium Gallium Garnet	YGG
	Yttrium Aluminium Garnet	Y ₃ Al ₅ O ₁₂ YAG
	Yttrium Aluminium Perovskite	YAlO ₃
	Yttrium Gallium Gadolinium Garnet	YGGG

	Substrate	Formula
	Yttrium Iron Garnet	YIG
	Yttrium Orthosilicate	Y ₂ SiO ₅
	Yttrium Vanadate	YVO ₄
	Zinc Aluminate Gahnite	ZnAl ₂ O ₄
	Zinc Oxide	ZnO
	Zinc Selenide	ZnSe
	Zinc Sulphide Spahlerite type	ZnS (Spahlerite)
	Zinc Sulphide Wurzit type	ZnS (Wurzit)
	Zinc Telluride	ZnTe
	Yttria Stabilised Zirconia (YSZ)	ZrO ₂ : 9,5 mol% Y ₂ O ₃

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PI-KEM - Helping you achieve your objectives



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