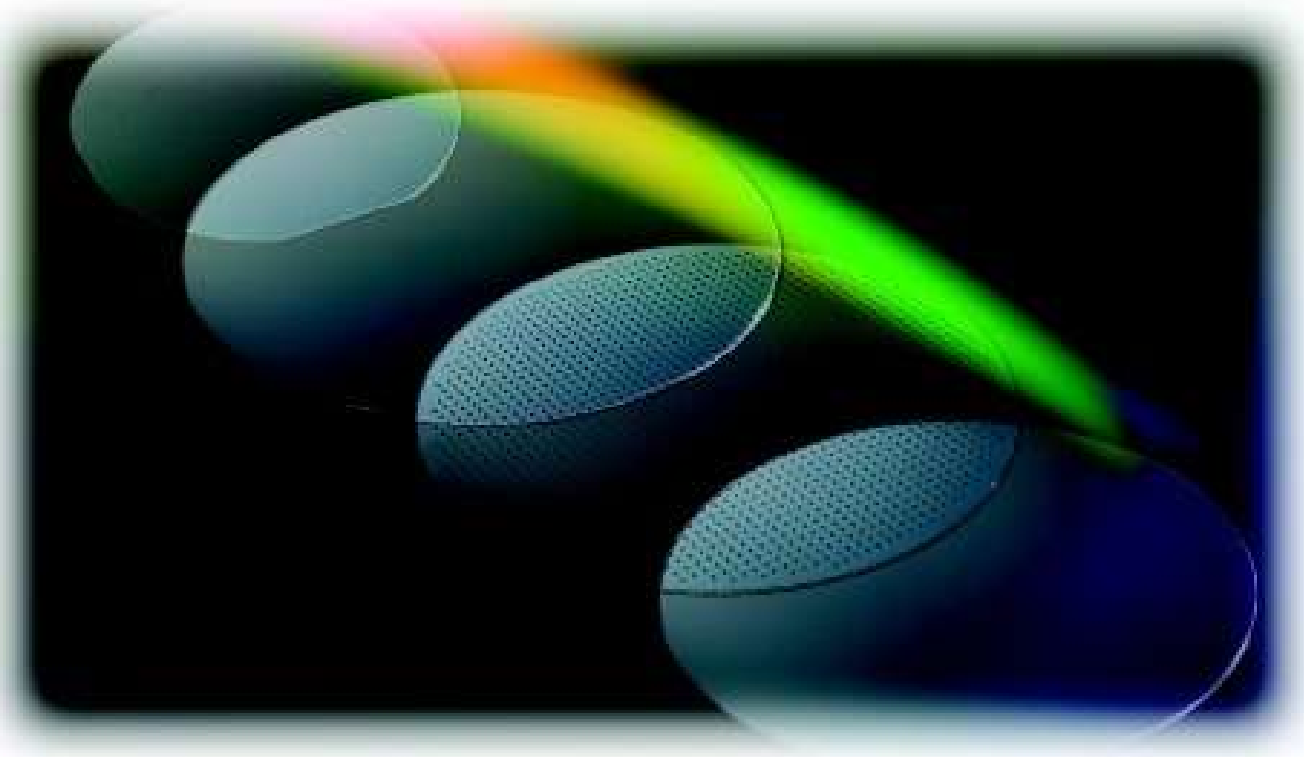
Edited : July 2025

結晶の未来を拓く

Crystals for a bright future



SHINKOSHA

株式会社　信光社

STEP Substrate

To provide stable surface quality, we offer oxide single-crystal **STEP substrates** with atomically flat TERRACE and STEP defined.
This makes it a suitable option for highly reproducible, high-quality deposition.

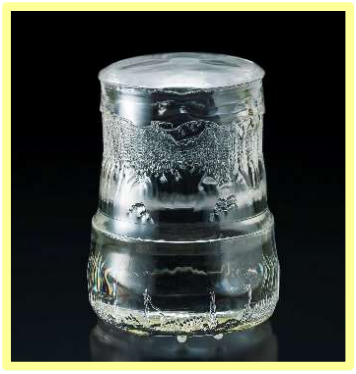
【Features】

- Stable surface quality improves reproducibility
- AFM images of all substrates are attached of delivery
- Some Nb-doped substrates are also available

Detail site

Sapphire

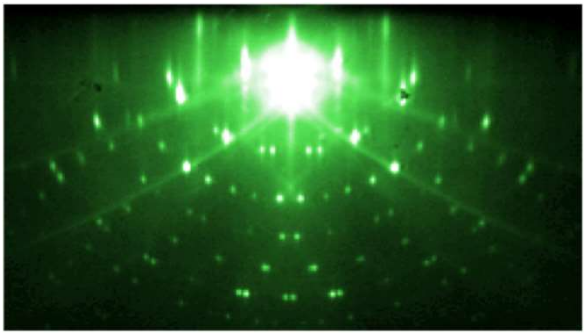
Single crystal of aluminum oxide. Colorless, transparent insulator of high crystal quality and purity.



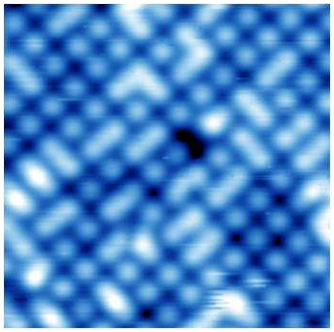
	Crystal system	Lattice constant	Size	Dopant
Al_2O_3	Trigonal (Rhombohedral)	a=0.47588nm c=1.2992nm	10×10×0.5mm 15×15×0.5mm	–
$SrTiO_3$	Cubic	a=0.3905nm		Nb:~0.05wt% (~0.1at%)
TiO_2	Tetragonal	a=0.45935nm c=0.29580nm		Nb:~0.5wt% (~0.43at%)
$LaAlO_3$	Pseudo – cubic	a_0=0.379nm		–

$SrTiO_3$

Typical crystal of perovskite structure, ideal for research on superconductors, dielectric thin films, etc. Electrically conductive substrates doped with Nb are also available.



RHEED pattern of $SrTiO_3$ (100)

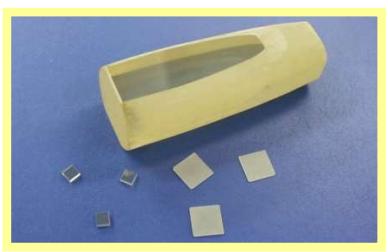


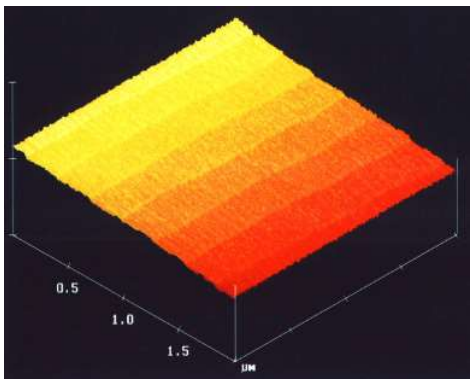
STM image of$SrTiO_3$ (100)

After annealing, atoms are arranged in an orderly manner on the surface
(Courtesy of Hitosugi Laboratory, The University of Tokyo)

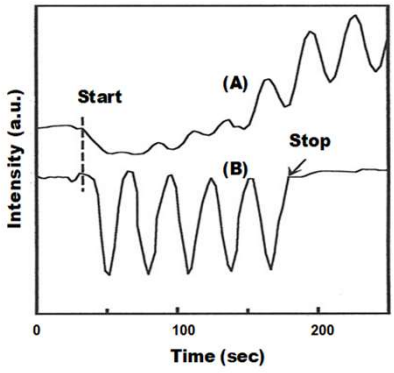
TiO_2(Rutile)

World-class crystal quality. Electrically conductive substrates doped with Nb are also available.





AFM Image of TiO2 STEP substrate



RHEED intensity oscillation pattern ($SrTiO_3$ homo-epitaxial growth)
(A) Normal polish, (B) STEP surface
On a STEP substrate, crystal grows layer by layer immediately.

All figures in graph and table are typical data (not guaranteed).

STEP Model List

Model Number	Material	Orientation	Orientation Flat	Size(mm)	Dopant	Model Type
AO-CS-10S	Sapphire	(0001)	(11-20)	10x10x0.5	—	○
AO-CS-15S	〃	〃	〃	15x15x0.5	—	△
AO-AS-10S	〃	(11-20)	(0001)	10x10x0.5	—	○
AO-AS-15S	〃	〃	〃	15x15x0.5	—	△
AO-RS-10S	〃	(01-12)	(11-20)	10x10x0.5	—	△
AO-RS-15S	〃	〃	〃	15x15x0.5	—	△
ST-AS-10S	$SrTiO_3$	(100)	(010)	10x10x0.5	—	☆
ST-AS-15S	〃	〃	〃	15x15x0.5	—	☆
ST-AS-10S-N05	〃	〃	〃	10x10x0.5	Nb:0.05wt%	○
ST-AS-15S-N05	〃	〃	〃	15x15x0.5	Nb:0.05wt%	○
TO-AS-15S	TiO_2	(100)	(001)	15x15x0.5	—	△
TO-DS-15S	〃	(110)	(110)	〃	—	△
TO-AS-15S-N05	〃	(100)	(001)	〃	Nb:0.05wt%	△
TO-DS-15S-N05	〃	(110)	(110)	〃	Nb:0.05wt%	△
TO-AS-15S-N50	〃	(100)	(001)	〃	Nb:0.5wt%	△
TO-DS-15S-N50	〃	(110)	(110)	〃	Nb:0.5wt%	△
LA-AS-10S	$LaAlO_3$	(100)	(010)	10x10x0.5	—	△
LA-AS-15S	〃	〃	〃	15x15x0.5	—	△

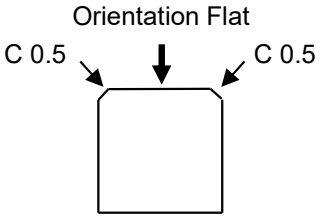
- Specialized package for STEP substrate
- Minimum order quantity : 5pcs
- AFM images will be attached

☆ : Planed inventory　○ : Standard　△ : Made-to-order

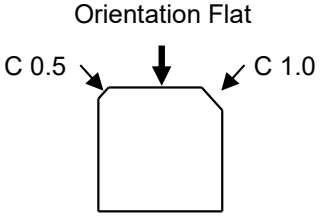
Specialized case for STEP substrate

Orientation Flat

One-side polished type



Both-side polished type
&
Offset angle type



<Visual check note>
We pass over the following:
(a) Chips within 0.2mm from the circumference of substrates
(b) Chips on the edge strip under 1/2 size of substrate thickness
(c) Scratches and blemish on the back side of single-side polished substrates

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URL : http://www.shinkosha.com/

Sapphire(α-Al_2O_3) Substrate

Sapphire is a single crystal of aluminum oxide (α-Al_2O_3). It is a colorless, transparent insulator with high crystal quality and purity. We have been dealing with sapphire for more than 75 years, and we offer our services based on our deep knowledge and rich experience. We would be delighted if this could be of help to your research.

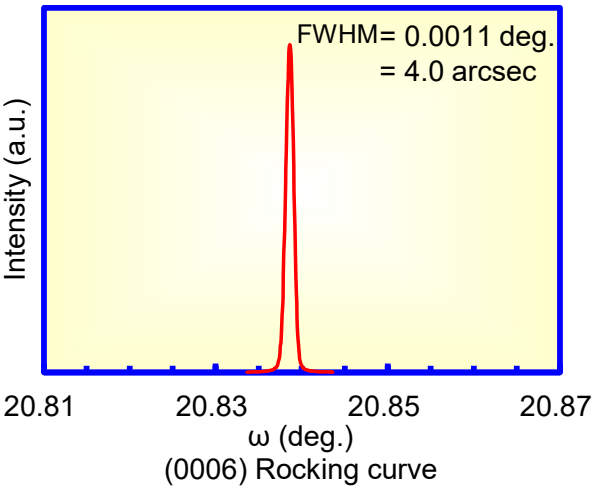
【Features】

- Crystals with both high crystallinity and high purity
- Optically usable due to their transparency
- Stable surface quality (compatible with STEP substrates)
- Also ideal for use as insulating plates

Detail site

【Characteristics】

Crystal system	Trigonal (Rhombohedral)
Crystal structure	Corundum
Space group	$R\bar{3}c$
Lattice constant	a = 0.47588 nm, c = 1.2992 nm (As hexagonal)
Melting point	2040 ℃
Density	3.987 g/cm^3
Dielectric constant	(//c axis) 9.41 at 30GHz
Dielectric loss	(//c axis) 3×10^{-5} at 30GHz
Thermal expansion	(at 200 ℃, c axis) 7.63×10^{-6} / ℃ (at 200 ℃, a axis) 6.93×10^{-6} / ℃ (at 1000 ℃, c axis) 9.97×10^{-6} / ℃ (at 1000 ℃, a axis) 8.89×10^{-6} / ℃



(0006) Rocking curve

【Standard Specifications】

Purity	>99.99%
Orientation	c(0001) , a(11-20) , r(01-12) , m(10-10) -plane Tolerance ±0.5°
Size	10 × 10 mm or 15 × 15 mm Tolerance ±0.1 mm
Thickness	0.5 mm Tolerance±0.05 mm
Polishing	One-side / Both-side
STEP	Available for : c-plane, a-plane, r-plane
Surface roughness	Ra ≦ 1.0 nm
Flatness	< 1 μm

If you are looking for other specs, please contact us.

All figures in graph and table are typical data (not guaranteed).

Sapphire Model List

Size (mm)	Polishing	Surface treatment	c-plane (0001)	a-plane (11-20)	r-plane (01-12)	m-plane (10-10)
10x10x0.5	One-side	Normal	☆	○	○	○
〃	Both-side	〃	○	○	○	△
〃	One-side	**STEP**	○	○	△	—
15x15x0.5	One-side	Normal	☆	△	△	△
〃	Both-side	〃	△	△	△	△
〃	One-side	**STEP**	△	△	△	—

☆ : Planed inventory　○ : Standard　△ : Made-to-order

Planned inventory: Production is regularly managed to ensure prompt delivery.
(Please note that specifications may change without prior notice.)
We also accept orders for different sizes and off-spec substrates.
Please contact us for details.

Model Number

AO — CS — 10N

Orientation
C : (0001)
A : (11-20)
R : (01-12)
M : (10-10)

Polishing
S : One-side
W : Both-side

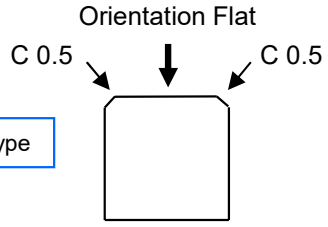
Size
10 : 10 × 10 × 0.5 mm
15 : 15 × 15 × 0.5 mm

Surface treatment
N : Normal
S : STEP

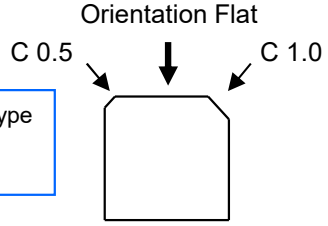
Orientation Flat

Substrate Orientation	Orientation Flat
c-plane (0001)	(11-20)
a-plane (11-20)	(0001)
r-plane (01-12)	(11-20)
m-plane (10-10)	(11-20)

One-side polished type



Both-side polished type & Offset angle type



<Visual check note>
We pass over the following:
(a) Chips within 0.2mm from the circumference of substrates
(b) Chips on the edge strip under 1/2 size of substrate thickness
(c) Scratches and blemish on the back side of single-side polished substrates

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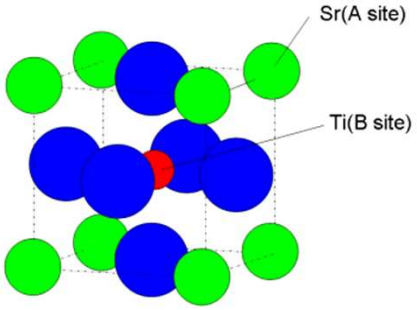
$SrTiO_3$(Strontium Titanate) Substrate

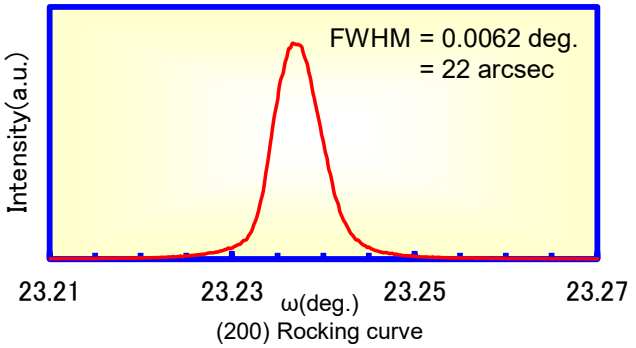
$SrTiO_3$ substrates composed of cubic crystals with a perovskite structure offer stable crystallinity and surface quality. Electrical conductivity can also be introduced through doping, making them suitable for applications such as electrical measurements.

【Features】

- High-quality, high-purity crystals
- Stable surface quality (compatible with STEP substrates)
- Conductive substrates can also be achieved by doping with Nb
- Suitable for optical applications due to their transparency



$SrTiO_3$ Structure



(200) Rocking curve

【Characteristics】

Crystal system	Cubic
Crystal structure	Perovskite
Space group	Pm3m
Lattice constant	a = 0.3905 nm
Melting point	2080 ℃
Density	5.122 g/cm^3 (20℃)
Dielectric constant	310 (27 ℃,1MHz)
Thermal expansion	11.1 × 10^{-6}/℃(r.t.～1000℃)
Phase transition	110K (tetragonal ⇔ cubic)
Refractive index	2.407 (at 589 nm)

【Standard Specifications】

Detail site

	SrTiO3	Nb:SrTiO3	
Purity	≧99.98%		
Nb concentration	0	0.05wt% (0.1at%)	0.5wt% (1.0at%)
Resistivity	＞10^7 Ω･cm	7～10 × 10^{-2} Ω･cm	3～7 × 10^{-3} Ω･cm
Career density	—	1～2 × 10^{19} cm^{-3}	1～2 × 10^{20} cm^{-3}
Split Angle	≦0.1°		
Orientation	(100) , (110) , (111) Tolerance±0.5°		
Size	10 × 10 × 0.5 mm , 15 × 15 × 0.5 mm Outer size tolerance: ±0.1 mm Thickness tolerance: ±0.05 mm		
Polishing	One-side / Both-side		
STEP	Available for (100)	—	
Surface roughness	Ra≦1.0 nm , Rmax≦5.0 nm		
Flatness	10 × 10 × 0.5 mm :≦λ , 15 × 15 × 0.5 mm : ≦1.5λ (λ=632.8 nm)		

If you are looking for other specs, please contact us.

All figures in graph and table are typical data (not guaranteed).

$SrTiO_3$ Model list

Doping	Size (mm)	Polishing	Surface treatment	Orientation		
				(100)	(110)	(111)
None	10x10x0.5	One-side	Normal	☆	○	☆
	〃	Both-side	〃	○	△	△
	〃	One-side	STEP	☆	—	—
	〃	Both-side	〃	○	—	—
	15x15x0.5	One-side	Normal	☆	△	△
	〃	Both-side	〃	△	△	△
	〃	One-side	STEP	☆	—	—
Nb:0.05wt%	10x10x0.5	One-side	Normal	☆	△	△
	〃	Both-side	〃	△	△	△
	〃	One-side	STEP	○	—	—
	15x15x0.5	One-side	Normal	○	△	△
	〃	Both-side	〃	△	△	△
	〃	One-side	STEP	○	—	—
Nb:0.5wt%	10x10x0.5	One-side	Normal	☆	△	△
	〃	Both-side	〃	△	△	△
	15x15x0.5	One-side	〃	○	△	△
	〃	Both-side	〃	△	△	△

☆ : Planed inventory　○ : Standard　△ : Made-to-order

Planned inventory: Production is regularly managed to ensure prompt delivery.
(Please note that specifications may change without prior notice.)
We also accept orders for different sizes and off-spec substrates.
Please contact us for details.

Model Number

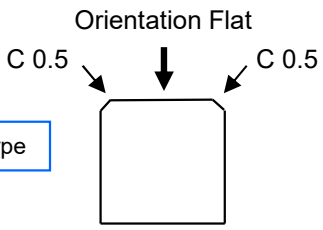
ST – AS – 10S – N05

- Orientation: A : (100), D : (110), G : (111)
- Size: 10 : 10 × 10 × 0.5 mm, 15 : 15 × 15 × 0.5 mm
- Dopant: No entry : Non doped, N05 : Nb 0.05wt%, N50 : Nb 0.5wt%
- Polishing: S : One-side, W : Both-side
- Surface treatment: N : Normal, S : STEP

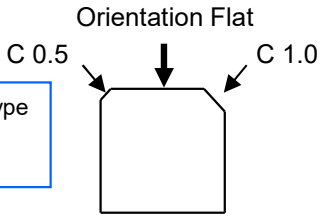
<Visual check note>
We pass over the following:
(a) Chips within 0.2mm from the circumference of substrates
(b) Chips on the edge strip under 1/2 size of substrate thickness
(c) Scratches and blemish on the back side of single-side polished substrates

Orientation Flat

One-side polished type



Both-side polished type & Offset angle type



Substrate Orientation	Orientation Flat
(100)	(010)
(110)	(100)
(110)	(110)

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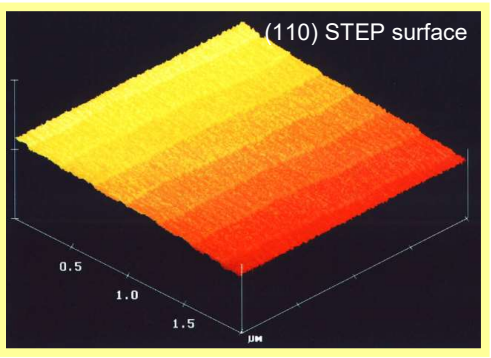
E-mail : sales@shinkosha.com
URL : http://www.shinkosha.com/

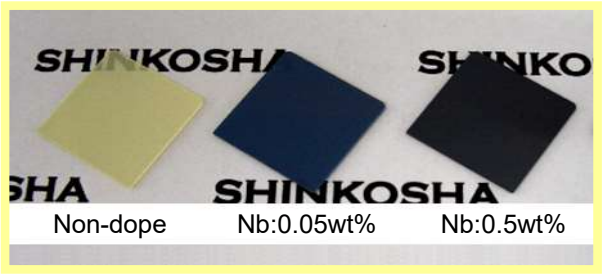
TiO_2(Rutile) Substrate

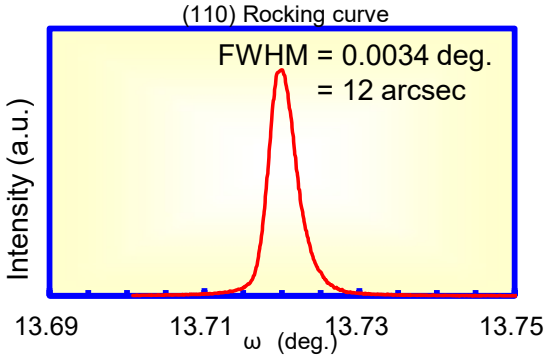
We offer rutile-type TiO_2 crystals in their high-temperature stable phase. These crystals provide stable crystallinity and surface quality, and can be made conductive through doping. We hope they will be useful for your research.

【Features】

- Available in various surface orientations of tetragonal crystals
- Stable surface quality (compatible with STEP substrates)
- Electrical conductivity can be introduced by doping with Nb
- Suitable for optical applications due to its transparency







Detail site

【Characteristics】

Crystal system	Tetragonal
Crystal structure	Rutile
Space group	$P4_2/mnm$
Lattice constant	a = 0.45935 nm c = 0.29580 nm
Melting point	1840 ℃
Density	4.252 g/cm^3(20℃)
Dielectric constant	113 (1MHz)
Thermal expansion	(// a-axis) 7.81 × 10^{-6}/℃ (// c-axis) 10.1 × 10^{-6}/℃
Band gap	3.0 eV
Refractive index	n_o = 2.5490 n_e = 2.8226 (at 706.5nm)

【Standard Specifications】

	TiO_2	Nb:TiO_2	
Nb concentration	0	0.05wt% (0.04at%)	0.5wt% (0.43at%)
Resistivity	＞10^7 Ω･cm	2.5～10 Ω･cm	0.20～0.35 Ω･cm
Orientation	(100) , (001) , (110) Tolerance : ±0.5°		
Size	10 × 10 × 0.5 mm , 15 × 15 × 0.5 mm Tolerance (outside dimension) : ±0.1 mm Tolerance (thickness) : ±0.05 mm		
Polishing	One-side / Both-side		
STEP	Available for (100), (110)		
Surface roughness	Ra ≦ 1.0nm , Rmax ≦ 5.0nm		
Flatness	10 × 10 × 0.5 mm :≦λ , 15 × 15 × 0.5 mm : ≦1.5λ (λ=632.8 nm)		

If you are looking for other specs, please contact us.

All figures in graph and table are typical data (not guaranteed).

TiO_2 Model list

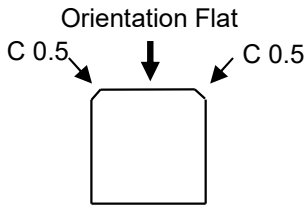
Doping	Size (mm)	Polishing	Surface treatment	Orientation (100)	Orientation (110)	Orientation (001)
None	10x10x0.5	One-side	Normal	☆	☆	☆
	〃	Both-side	〃	△	△	○
	〃	One-side	STEP	△	△	–
	15x15x0.5	One-side	Normal	○	○	○
	〃	Both-side	〃	△	△	○
	〃	One-side	STEP	△	△	–
Nb:0.05wt%	10x10x0.5	One-side	Normal	○	○	△
	〃	Both-side	〃	△	△	△
	〃	One-side	STEP	△	△	–
	15x15x0.5	One-side	Normal	○	○	△
	〃	Both-side	〃	△	△	△
	〃	One-side	STEP	△	△	–
Nb:0.5wt%	10x10x0.5	One-side	Normal	○	○	△
	〃	Both-side	〃	△	△	△
	〃	One-side	STEP	△	△	–
	15x15x0.5	One-side	Normal	○	○	△
	〃	Both-side	〃	△	△	△
	〃	One-side	STEP	△	△	–

☆ : Planed inventory　○ : Standard　△ : Made-to-order

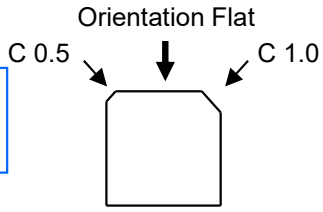
Planned inventory: Production is regularly managed to ensure prompt delivery.
(Please note that specifications may change without prior notice.)
We also accept orders for different sizes and off-spec substrates.
Please contact us for details.

Orientation Flat

One-side polished type



Both-side polished type
&
Offset angle type



Model Number

Polishing
S : One-side
W : Both-side

Surface treatment
N : Normal
S : STEP

TO – AS – 10N – N05

Orientation
A : (100)
D : (110)
C : (001)
E : (101)
G : (111)

Size
10 : 10 × 10 × 0.5 mm
15 : 15 × 15 × 0.5 mm

Dopant
No entry : Non doped
N05 : Nb 0.05wt%
N50 : Nb 0.5wt%

<Visual check note>
We pass over the following:
(a) Chips within 0.2mm from the circumference of substrates
(b) Chips on the edge strip under 1/2 size of substrate thickness
(c) Scratches and blemish on the back side of single-side polished substrates

Substrate Orientation	Orientation Flat
(100)	(001)
(110)	(110)
(001)	(110)
(101)	(100)
(111)	(110)

SHINKOSHA Co., Ltd.

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$LaAlO_3$ (Lanthanum Aluminate) Substrate

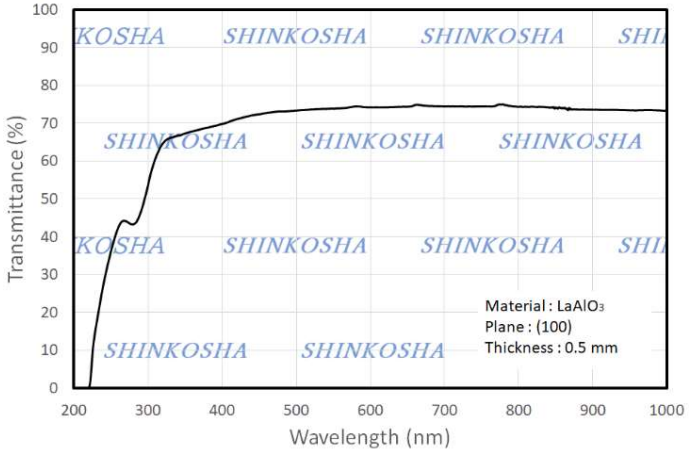
A phase transition occurs around 420 ° C, resulting in a trigonal crystal structure at room temperature. However, the material is often treated as a pseudo-cubic crystal for high-temperature applications, and is used as a substrate with a lattice constant of *a = 0.379nm* (cubic notation).
Due to the phase transition during cooling after crystal growth, twinning may occur in the crystal, making high crystallinity at room temperature difficult to achieve.
Nevertheless, stable surface quality (compatible with STEP substrates) can still be provided.

【Features】

- *Phase transition occurs around 420 ° C*
- *Stable surface quality (compatible with STEP substrates)*
- *Suitable for optical applications due to its transparency*

Detail site

Transmittance of $LaAlO_3$ substrate



【Characteristics】

Crystal system	Trigonal (Pseudo-cubic) *
Crystal structure	Pseudo-Perovskite
Space group	$R\bar{3}c$
Lattice constant	a_0 = 0.379 nm (Pseudo-cubic)
Melting point	2100 ℃
Density	6.52 g/cm^3
Dielectric constant	15～22 (27℃,1MHz)
Thermal expansion	12.6×10^{-6}/℃
Phase transition temperature	Approx. 420 ℃ (Trigonal ⇔ Cubic)
Twin crystal	Generated by phase transition

【Standard Specifications】

Orientation	（100）, (110) Tolerance±0.5° (in Pseudo-cubic)
Size	10×10×0.5 mm , 15×15×0.5 mm Tolerance (outside dimension) : ±0.1 mm Tolerance (thickness) : ±0.05 mm
Polishing	One-side / Both-side
STEP	Available for (100)
Surface roughness	Ra ≦1.0nm , Rmax ≦5.0nm

If you are looking for other specs, please contact us.

*$LaAlO_3$ is a trigonal crystal (a=0.5357nm, α=60.1°) accurately, but it is treated as a pseudo-cubic or hexagonal crystal generally.

All figures in graph and table are typical data (not guaranteed).

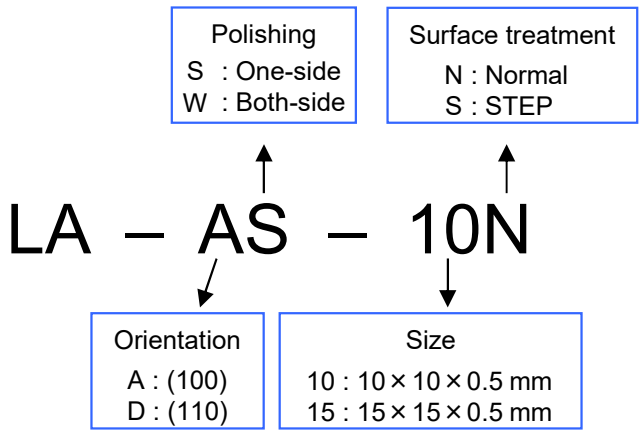
$LaAlO_3$ Model list

Size (mm)	Polishing	Surface treatment	Orientation	
			(100)	(110)
10x10x0.5mm	One-side	Normal	○	△
〃	Both-side	〃	○	△
〃	One-side	**STEP**	△	–
15x15x0.5mm	One-side	Normal	○	△
〃	Both-side	〃	△	△
〃	One-side	**STEP**	△	–

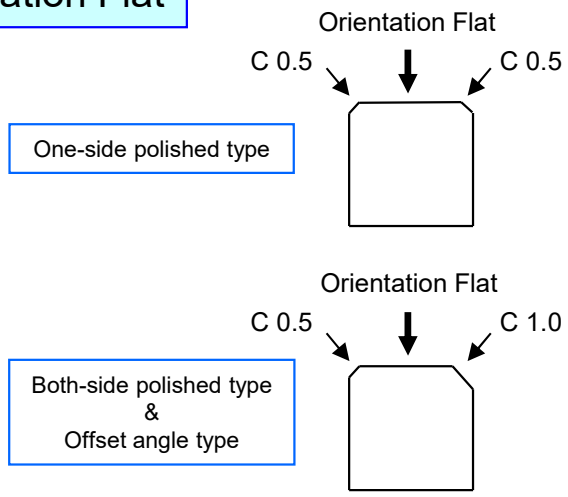
○ : Standard　△ : Made-to-order

If you are looking for different sizes (up to φ2 in), offset angle type and others, please contact us.
*Minimum order for STEP model, made-to-order model and special model : 5pcs

Model Number



Orientation Flat



Substrate Orientation	Orientation Flat
(100)	(010)
(110)	(100)

<Visual check note>
We pass over the following:
(a) Chips within 0.2mm from the circumference of substrates
(b) Chips on the edge strip under 1/2 size of substrate thickness
(c) Scratches and blemish on the back side of single-side polished substrates

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$NdGaO_3$ (Neodymium Gallate) Substrate

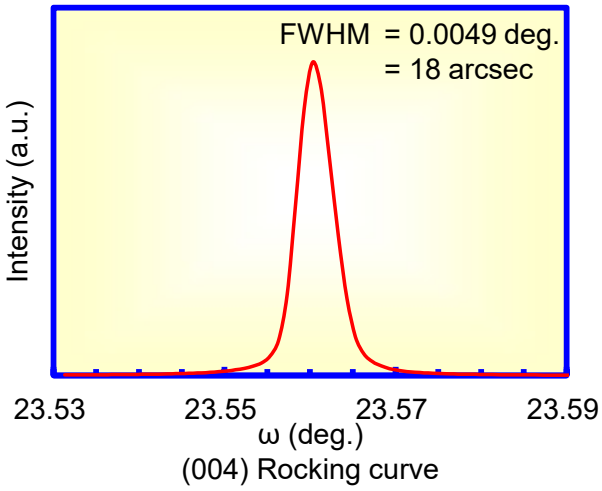
Although it has an orthorhombic crystal structure, the Ga–Ga interatomic distance is approximately 0.386 nm on the (110) and (001) planes, making it widely used as a substrate with a lattice constant intermediate between $SrTiO_3$ and $LaAlO_3$.
High-quality crystals can be reliably obtained through the Czochralski (CZ) method using a stoichiometric melt.

【Features】

- *Lattice constant intermediate between $SrTiO_3$ and $LaAlO_3$ substrates*
- *High-quality crystals can be stably obtained*
- *In-house crystal production enables excellent QCD (Quality, Cost, Delivery) performance*

【Characteristics】

Crystal system	Orthorhombic
Crystal structure	Perovskite
Lattice constant	a = 0.5431 nm b = 0.5499 nm c = 0.7710 nm
Melting point	1650 ℃
Density	7.56 g/cm^3
Dielectric constant	20～25 (27℃,1MHz)
Thermal expansion	10×10^{-6}/℃



【Standard Specifications】

Orientation	(100) , (001) , (110) , (011) Tolerance : ±0.5°
Size	10 × 10 × 0.5mm 15 × 15 × 0.5mm Tolerance (outside dimension) : ±0.1 mm Tolerance (thickness) : ±0.05 mm
Polishing	One-side / Both-side
Surface roughness	Ra ≦1.0nm , Rmax ≦5.0nm
Flatness	10 × 10 × 0.5mm : ≦ λ 15 × 15 × 0.5mm : ≦ 1.5λ (λ=632.8nm)

Detail site

If you are looking for other specs, please contact us.

All figures in graph and table are typical data (not guaranteed).

$NdGaO_3$ Model list

Size (mm)	Polishing	Orientation			
		(100)	(001)	(110)	(011)
10x10x0.5mm	One-side	○	○	☆	△
〃	Both-side	△	△	△	△
15x15x0.5mm	One-side	△	△	△	△
〃	Both-side	△	△	△	△

☆ : Planed inventory　○ : Standard　△ : Made-to-order

Planned inventory: Production is regularly managed to ensure prompt delivery.
(Please note that specifications may change without prior notice.)
We also accept orders for different sizes and off-spec substrates.
Please contact us for details.

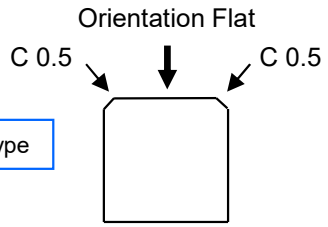
Model Number

NGO – AS – 10N

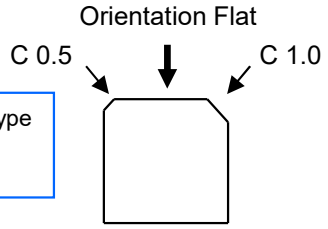
- AS: Polishing — S : One-side, W : Both-side; Surface treatment — N : Normal
- 10N: Size — 10 : 10 × 10 × 0.5 mm, 15 : 15 × 15 × 0.5 mm
- Orientation — A : (100), C : (001), D : (110), F : (011)

Orientation Flat

One-side polished type



Both-side polished type & Offset angle type



Substrate Orientation	Orientation Flat
(100)	(001)
(001)	(100)
(110)	(001)
(011)	(001)

<Visual check note>
We pass over the following:
(a) Chips within 0.2mm from the circumference of substrates
(b) Chips on the edge strip under 1/2 size of substrate thickness
(c) Scratches and blemish on the back side of single-side polished substrates

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Oxide Single Crystal Substrate

We offer a variety of oxide single-crystal substrates suitable for epitaxial growth.
For details on sapphire, $SrTiO_3$, rutile, $LaAlO_3$, and $NdGaO_3$, please refer to the individual product catalogs.

Detail site

【Characteristics】 (Reference data)

Crystal	MgO	YSZ	LSAT	$MgAl_2O_4$
Crystal system	Cubic	Cubic	Cubic	Cubic
Crystal structure	NaCl	CaF_2	Perovskite	Spinel
Lattice constant	a = 0.4213 nm	a = 0.5139 nm	a = 0.7736 nm	a = 0.8083 nm
Melting point	2800 ℃	2500 ℃	1840 ℃	2130 ℃
Density	3.59 g/cm^3	6.05 g/cm^3	6.79 g/cm^3	3.64 g/cm^3
Thermal expansion	13.5x10^{-6}/℃	10.3x10^{-6}/℃	10x10^{-6}/℃	7.5x10^{-6}/℃
Dielectric constant	10	27	22	—

【Standard Specifications】

Orientation tolerance	±0.5°
Size	10×10×0.5 mm , 15×15×0.5 mm (max : φ2in) Outer size tolerance : ±0.1 mm Thickness tolerance : ±0.05 mm
Surface roughness	Ra ≦1.0nm , Rmax ≦5.0nm
Flatness	10×10×0.5mm : ≦λ , 15×15×0.5mm : ≦1.5λ (λ=632.8nm) ※ Excluding MgO and $MgAl_2O_4$

*This table is made for a general specification. Since it may differ from above specifications depending on materials and orientations, please ask us for the details.

MgO

Orientation	Orientation flat	Size	One-side polishing	Both-side polishing
(100)	(010)	10x10x0.5mm	○	○
〃	〃	15x15x0.5mm	○	△

YSZ

Yttria Stabilized Zirconia (Y_2O_3≒10mol%)

Orientation	Orientation flat	Size	One-side polishing	Both-side polishing
(100)	(010)	10x10x0.5mm	○	○
〃	〃	15x15x0.5mm	○	△
(111)	(110)	10x10x0.5mm	☆	○

【Note】YSZ is not able to be exported from Japan

☆ : Planed inventory　○ : Standard　△ : Made-to-order

Planned inventory: Production is regularly managed to ensure prompt delivery.
(Please note that specifications may change without prior notice.)
We also accept orders for different sizes and off-spec substrates.
Please contact us for details.

LSAT

$(La_{0.3}Sr_{0.7})(Al_{0.65}Ta_{0.35})O_3$

Orientation	Orientation flat	Size	One-side polishing	Both-side polishing
(100)	(010)	10x10x0.5mm	☆	△
〃	〃	15x15x0.5mm	○	△

$MgAl_2O_4$

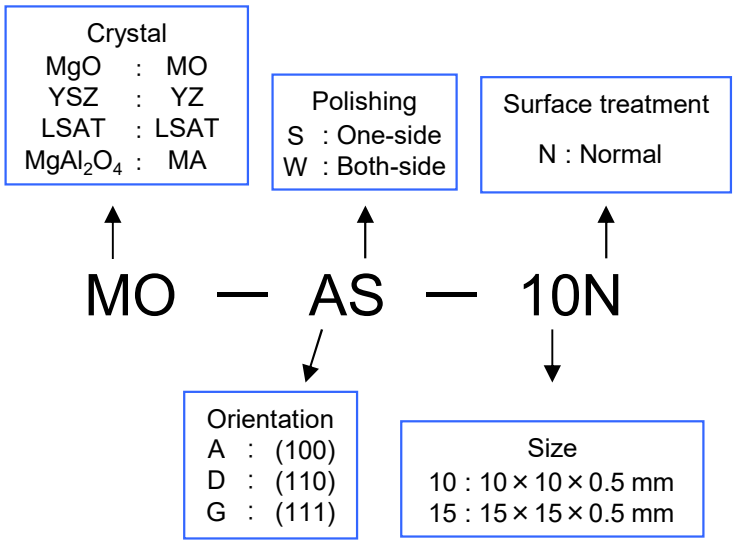
Spinel

Orientation	Orientation flat	Size	One-side polishing	Both-side polishing
(100)	(010)	10x10x0.5mm	○	△
(111)	(110)	10x10x0.5mm	△	△

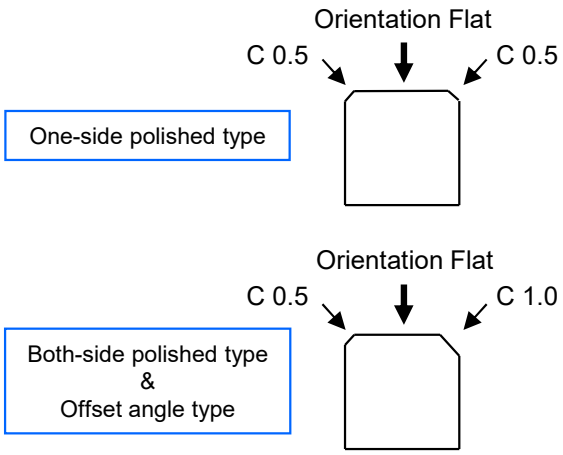
☆ : Planed inventory　○ : Standard　△ : Made-to-order

Planned inventory: Production is regularly managed to ensure prompt delivery.
(Please note that specifications may change without prior notice.)
We also accept orders for different sizes and off-spec substrates.
Please contact us for details.

Model Number



Orientation Flat



<Visual check note>
We pass over the following:
(a) Chips within 0.2mm from the circumference of substrates
(b) Chips on the edge strip under 1/2 size of substrate thickness
(c) Scratches and blemish on the back side of single-side polished substrates

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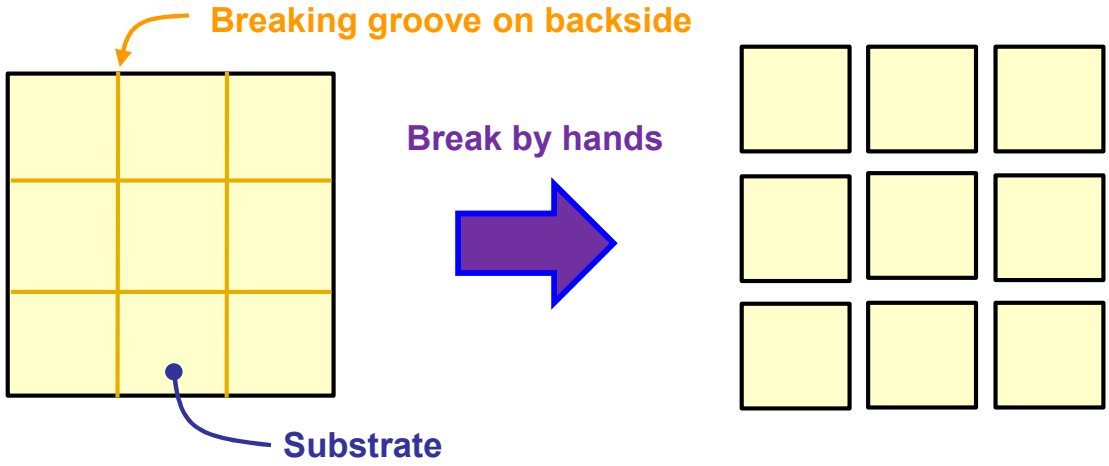
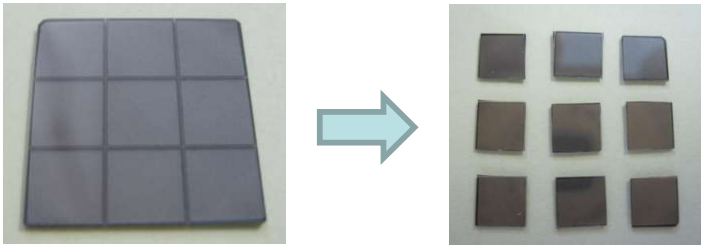
Breakable Substrates

To facilitate easy division when using our single-crystal substrates, we offer substrates with pre-formed breaking grooves on the backside.



Since breaking grooves are pre-formed, the substrate can be cleanly and efficiently divided by hand—just like breaking a chocolate bar—without the need for diamond cutters or cutting machines.

Example:
Nb:$SrTiO_3$
15x15x0.5mmt



Before
(As shipped)

After
(Broken up by hand)

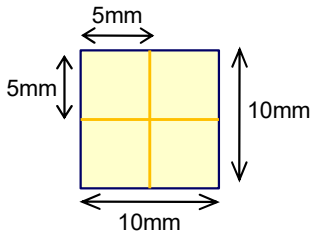
Detail site

Standard model

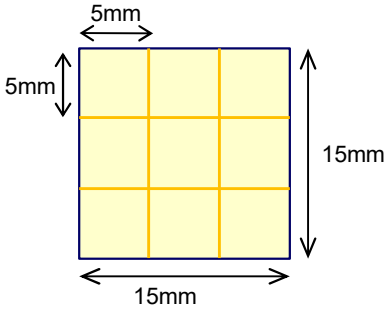
Material	Substrate size	Breakup pattern
$SrTiO_3$	①10x10 mm	①4 segments of 5x5 mm
TiO_2		
$LaAlO_3$		
LSAT	②15x15 mm	②9 segments of 5x5 mm
YSZ		
$MgAl_2O_4$		

***Please feel free to ask us for other breakup patterns.**

① For 10x10 mm substrate



② For 15x15 mm substrate



<Visual check note>
We pass over the following:
(a) Chips within 0.2mm from the circumference of substrates
(b) Chips on the edge strip under 1/2 size of substrate thickness
(c) Scratches and blemish on the back side of single-side polished substrates
(d) Chips from grooving process on the back side of substrates

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Operating Suggestions for Oxide Single Crystal Substrates

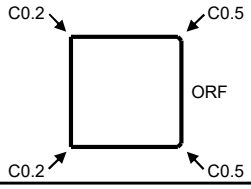
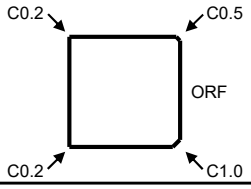
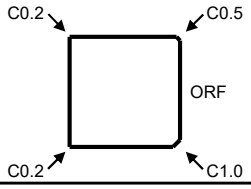
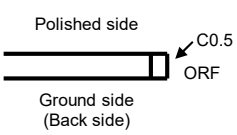
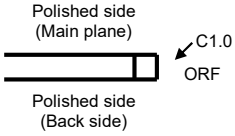
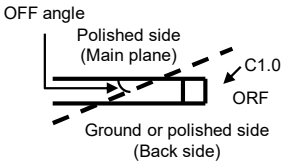
(1) Guaranteed figures

	Guaranteed figures
Size tolerance	±0.1 mm
Thickness tolerance	±0.05 mm
Orientation tolerance 1)	±0.5°
Orientation flat tolerance	±1.0°
Flatness 2)	10×10×0.5 mm substrate :≦ λ 15×15×0.5 mm substrate :≦ 1.5λ (λ=632.8nm)

1) STEP substrates : ±0.3° , OFF substrates : Designed OFF angle±0.1°
2) Excluding $LaAlO_3$, MgO and $MgAl_2O_4$ substrates

(2) Cleaning of substrates
- Normal substrates :
  Standard cleaning is done, but we recommend an additional cleaning by yourself.
- STEP substrates :
  For 10×10×0.5 mm and 15×15×0.5 mm size substrates, precision cleaning and special packing are done. For other sizes, standard cleaning and packing are done. We recommend an additional cleaning by yourself.

(3) Orientation Flat (ORF)
- Standard size substrates have “Orientation Flat Markings” (size C0.5 or C1.0) at the corners as below .

	One-side polished Substrate	Both-side polished substrate	OFF substrate
Front view			
Side view			

(4) Main plane
- We can only assure the quality of “Main plane” for both-side polished substrates (including STEP substrates) due to the nature of our manufacturing process. Please use “Main plane” for your work.

(5) Visual check note
- We pass over the following:
  (a) Chips within 0.2mm from the circumference of substrates
  (b) Chips on the edge strip under 1/2 size of substrate thickness
  (c) Scratches and blemish on the back side of single-side polished substrates

(6) Crystallinity
- $LaAlO_3$ substrates contain twins.
- $SrTiO_3$, TiO_2, MgO and YSZ substrates may contain small sub-grain boundaries due to the nature of their manufacturing process. It may be shown in multi peaks in their X-ray rocking curve.

If you have any questions, please feel free to contact us.

SHINKOSHA
株式会社 信光社
結晶の未来を拓く
Crystals for a bright future

July. 2025