

Single Crystal Sapphire & Step Sapphire Wafers

Sapphire($\text{a-Al}_2\text{O}_3$) is widely used in many fields from its excellent characteristics, in particular chemical resistance, thermal conductivity, hardness, transparency. Namiki grows single crystal sapphire by EFG method, featuring any desired section forms can be obtained.

Variouly-shaped Nano-step structures can be formed on the Sapphire wafer surface, and have been expected to be used as the height standard sample for SPM and Immobilization plate for observing biomaterials.

<Characteristics of Single Crystal Sapphire>

1. High-hardness - abrasion resistance
2. Transparency - in the range from ultraviolet to infrared light (200-7000nm)
3. Chemical resistance and heat resistance- resist almost all kinds of acid and alkaline, heat up to 2000°C.
4. Suitable for the application of insulation property required.

<Application of Single Crystal Sapphire>

- Sapphire Wafers
- Semiconductor wafers
- LED wafers
- Projectors
- Optical device wafers

<Characteristics on EFG Method>

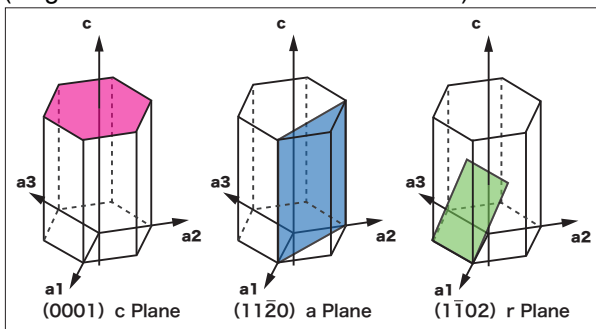
1. Growth of sapphire wafers with large diameter
2. Controllability of crystal orientation

<Application of Sapphire Tube>

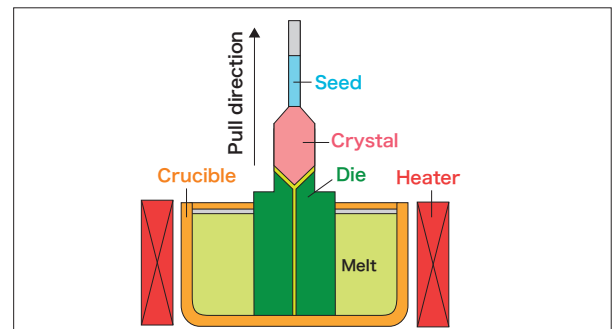
- Analyzer
- Guard pipe of thermocouple

Single Crystal Sapphire Growth

Namiki produces single crystal sapphire in any desired section shape by EFG Method. (Edge-defined Film-fed Growth Method)



▲ Single Crystal



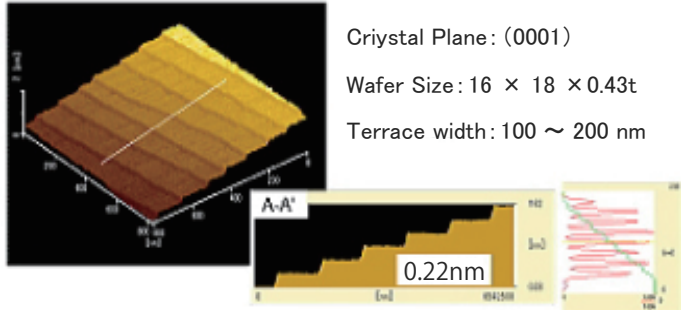
▲ EFG Method

<Crystal Shape after pull-up>

Sectional View	Dimensions	Tolerance	Crystal Orientation	Surface Flatness
	0.3~300mm t=0.01~100	±0.005	±2deg	Ra=0.0001 μm
	0.3~300mm	±0.005	C Axis in	5 μm
	O.D:Max. Φ 100mm	±0.005	—	5 μm
	I.D:Min. Φ 2.0mm	±0.002	—	5 μm
	Offer any desired sectional shape.	—	C Axis in	5 μm

Step Sapphire Wafers

Step Wafers (height: 0.22nm)

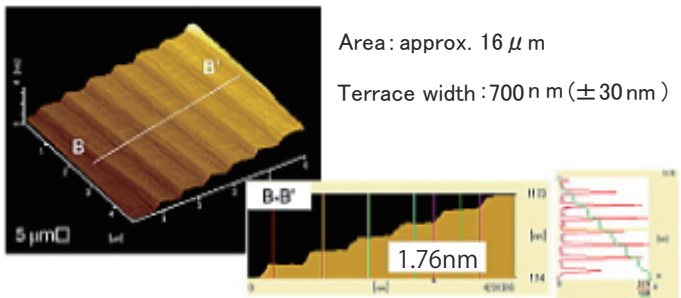


<Advantages>

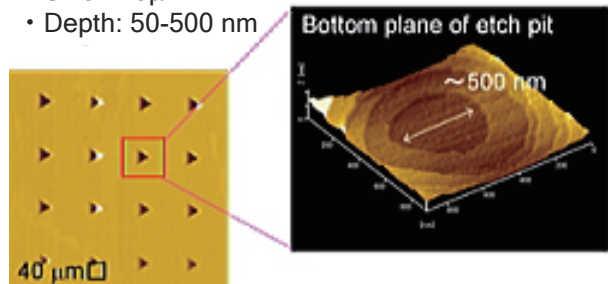
- Long Life
- Low Cost (re-cleanable)
- Useful in various measurement environment (High Temperature Resistance, Chemical Resistance)
- Entire Linear Surface in Wide Area
- Step Height Uniformity (0.22nm±0.01nm)
- Extra Smooth Surface Terraces
- Terrace Width is Controllable (100~200nm)

Relevant Patent Applications: JPA2007-181007

Multi Step Wafers (height; 1.76nm)



- Size: 1-5μm
- Depth: 50-500 nm



Relevant Patent Applications:
 JPA006-284316, JPA2007-181007

<Expected Applications>

- Height standard sample for SPM
- Immobilization plate for observing biomaterials such as DNA, Protein.

