

Highly Orientated Pyrolytic Graphite



**conical HOPG
(since 1989)**

The Original Graphite Monochromators

Our HOPG graphite monochromators are highly oriented forms of high purity pyrolytic graphite which diffract x-rays and neutrons with greater efficiency than any other material. In x-ray analysis, intensity is increased 3 to 5 times over that obtained with conventionally used crystals. A singly-bent focusing monochromator using graphite yields 3 times the intensity of lithium fluoride at equivalent resolution. Advanced Ceramics Corporation originally introduced HOPG, and still offers, graphite monochromators with the lowest mosaic spread available.

Applications of HOPG

- Graphite Monochromators
- X-Ray diffraction
- Neutron scattering and diffraction
- Scanning tunneling microscopy-calibration and substrates

Physical Characteristics of HOPG (at 300K)

Spacing of Reflecting Planes (002)		3.355 - 3.359Å
Mosaic Spread ¹⁾		>= 0.4°
Density		2.255 - 2.265 gem ⁻³
Thermal Conductivity	Parallell (002)	16 - 20 Watt/cm K
	Perpendicular (002)	ca. 0.8 Watt/cm K
Thermal Expansion	Parallell (002)	Slightly negative
	Perpendicular (002)	20 x 10 ⁻⁶ / K
Electrical Resistivity	Parallell (002)	3.5 - 4.5 x 10 ⁻⁵ Ohm cm
	Perpendicular (002)	0.15 - 0.25 Ohm cm

¹⁾ Mosaic spread is the half maximum height peak width of the Cu-K_a

Products

HOPG plates are produced as flat, singly-bent and double-bent shapes. The monochromators are classified according to mosaic spread.

Grade	Mosaic Spread	Nominal thickness mm**	Minimum* size (mm)	Maximum* size (mm)
ZYA	0.4° ± 0.1°	2	12 x 12	50 x 50
ZYB	0.8° ± 0.2°	2	12 x 12	50 x 75
ZYD	1.2° ± 0.2°	2, 4	12 x 12	50 x 75
ZYH	3.5° ± 1.5°	2, 4, 6, 8	12 x 12	75 x 75

* other sizes or specific mosaic spread on request

** Tolerance ± 0/-1 mm

Standard radii for singly-bent plates: 115, 225, 250, 510, 790, and 1.300 mm.

Standard size for bent monochromators (mm): Thickness for bent plates 2 + 0/-1 mm.

15 x 15, 25, 40, 50 25 x 25, 40, 50, 75