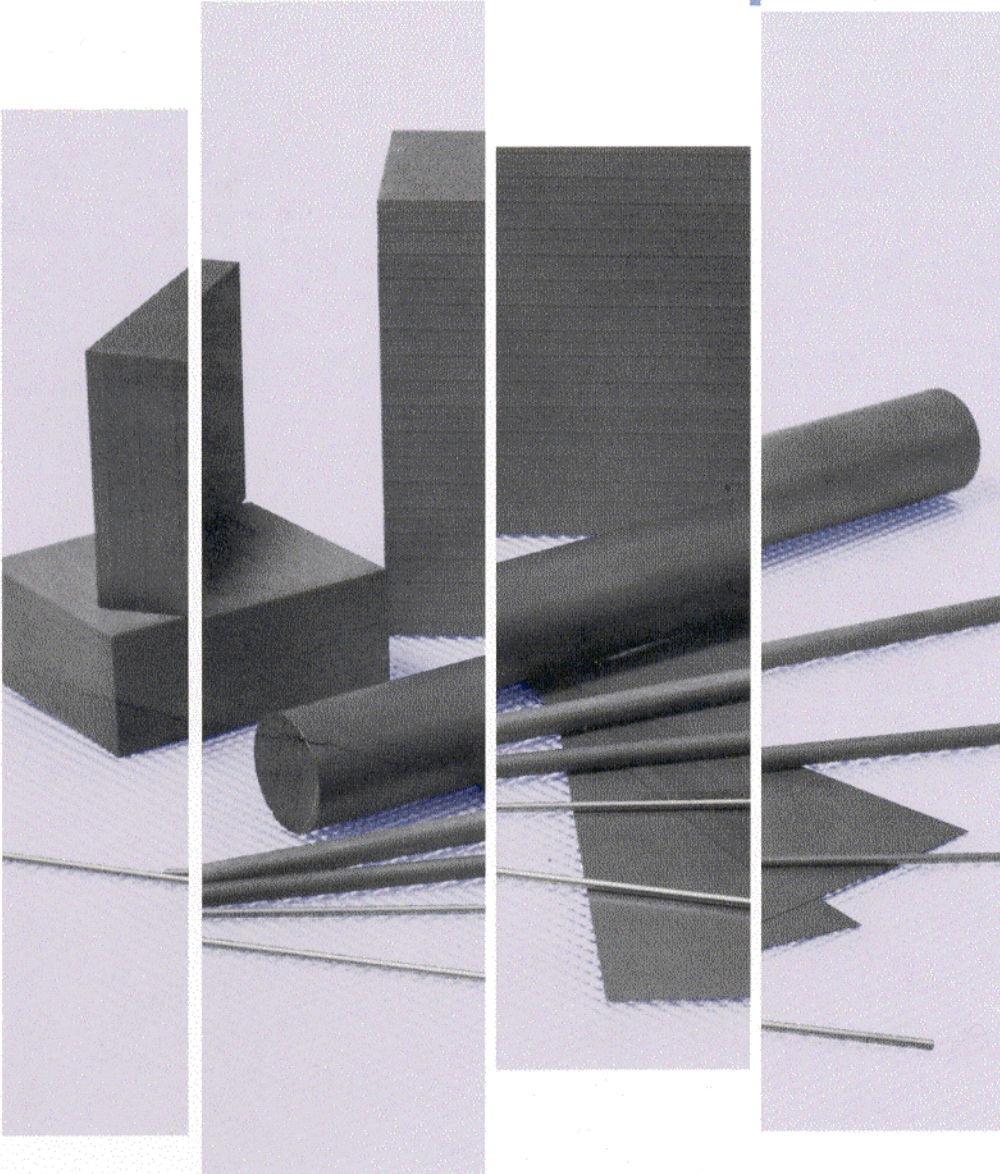


P | O | C | O

SPECIALTY

MATERIALS



Graphite Grades for Semiconductor Applications

Manufacturing Capabilities

Purification

- Reduces mobile, metallic and organic impurities to less than 5 ppm - 99.9995% PURE. (as determined by ash analysis).
- Used for applications requiring extremely high purity and contamination-free components.
- Bulk material or finished products can be purified.
- Add -2 to the grade needed (eg. DFP-2).

Typical Purified POCO Graphite GDMS Elemental Data Analysis

Element	PPM Concentration
Na	< 0.005*
Mg	< 0.005*
Al	0.09
K	< 0.005*
Ca	< 0.005*
Ti	0.02
V	0.002
Mn	< 0.001*
Fe	0.03
Ni	0.01
Cu	< 0.001*
Zn	< 0.005*

**Denotes value below detection limits.*

Densification

- Reduces open porosity by 80% by means of partially filling open pores with pure carbon.
- Produces a material with very low permeability, an advantage in many applications.
- Increases life time by reducing erosion rate.
- Add -3 to the grade needed (eg. DFP-3-2).

Pyrolytic Carbon Treatment

Purified, finished parts go through a unique, proprietary CVD process that provides a nonporous surface with an amorphous carbon coating.

Available for different material substrates and diverse applications:

PYROGRAPH®

Ion Implant and etch applications.
Superior erosion resistance.

FABMATE®

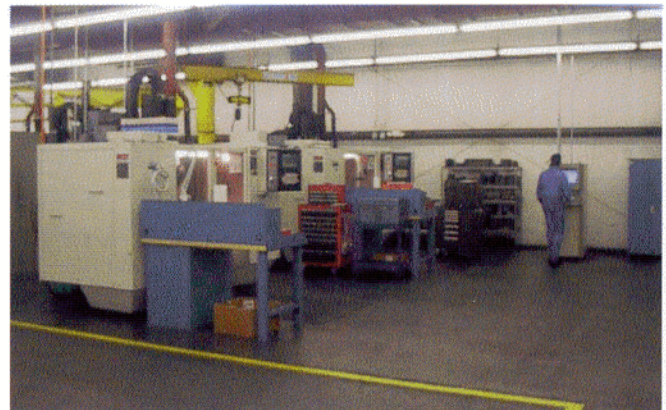
Many front end applications.
Nonporous surfaces inhibits liquid intake.
Replacement for quartz.
Acid resistant.

DURABRAZE®

Back-end packaging applications.
Abrasion resistance.
Particle-free surface.

Machining Operations

- High volume production capacity or quick-turn items.
- State of the art CNC machines.
- CMM and optical inspection equipment.
- Materials Analysis Lab.



Typical Material Properties

	SFG-1	DFP-1	DFP-1C Copper Impregnated	TRA-1	HPD-1	CZR-1	SCF-1	PLS-1	FM-1
Particle Size									
microns	1	4	4	5	5	6	6	10	20
μ•inches	40	160	160	200	200	240	240	400	800
Coefficient of Thermal Expansion									
microns/m °C	8.1	8.1	8.7	7.9	8.1	7.8	7.6	8.3	7.5
μ•in/in °F	4.5	4.5	4.8	4.4	4.5	4.3	4.2	4.6	4.2
Compressive Strength									
N/mm ²	170	140	210	125	150	105	170	110	85
psi	25,000	20,000	30,500	18,000	22,000	15,000	25,000	15,500	12,500
Flexural Strength									
N/mm ²	110	85	115	70	90	55	95	60	45
psi	16,000	12,000	17,000	10,000	13,000	8,000	13,500	8,500	6,500
Tensile Strength⁽¹⁾									
N/mm ²	75	60	85	50	60	38	65	40	30
psi	11,000	8,500	12,000	7,000	9,000	5,500	9,500	6,000	4,500
Hardness									
SSH	85	74	67	72	80	68	91	65	58
Electrical Resistivity									
μ•ohm•cm	1950	1500	265	1650	2000	1900	2800	1220	1240
μ•ohm•in	770	600	105	650	790	750	960	480	490
Apparent Density									
g/cc	1.80	1.77	3.10	1.73	1.77	1.65	1.77	1.82	1.70
lb/in ³	0.065	0.064	0.11	0.063	0.064	0.060	0.064	0.066	0.061
Thermal Conductivity									
watts/m K	72	95	175 ⁽²⁾	85 ⁽²⁾	85 ⁽²⁾	76 ⁽²⁾	60 ⁽²⁾	105	110
BTU•ft/hr •ft ² •°F	42	55	100 ⁽²⁾	50 ⁽²⁾	50 ⁽²⁾	44 ⁽²⁾	35 ⁽²⁾	60	64
Oxidation Threshold⁽³⁾									
°C	450	440	500	430	450	420	480	460	470
°F	840	820	930	810	840	790	900	860	880

¹ Estimated at 70% of flexural strength.

² Estimated values.

³ Temperature that results in 1% wt. loss in 24 hrs. Oxidation threshold increases by approximately 100° C if graphite is purified.

**Bulk material available from inventory in standard sizes and grades.
Call for pricing and availability.**

Services Available

- Customer Service Support.
- Design engineering staff to model and prototype.
- Electronic file exchange capability (IGES, DXF, etc.).
- Applications engineering support—technical training available on-site or at POCO.
- Various levels of certification available.
- Traceability on bulk material and finished parts.

POCO Silicon Carbides

- High temperature & atmospheric processes.
- Harsh process environments.
- Vertical & horizontal wafer carriers and components.
- Other semiconductor applications.

Material Solutions for the New Millenium

POCO Specialty Materials

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E-mail: semiconductor@poco.com
www.poco.com

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