Ceramic Components for Semiconductor Processing
### Material Characteristics

<table>
<thead>
<tr>
<th>Item</th>
<th>Material</th>
<th>Unit</th>
<th>A-479</th>
<th>A-4790</th>
<th>A-480S</th>
<th>A-480C</th>
<th>SA-10C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Kyocera No.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Color</strong></td>
<td></td>
<td></td>
<td>Black</td>
<td>Black</td>
<td>Black</td>
<td>Black</td>
<td>Yellow</td>
</tr>
<tr>
<td><strong>Bulk Density</strong></td>
<td></td>
<td>g/cm³</td>
<td>3.1 ± 0.1</td>
<td>3.1 ± 0.1</td>
<td>3.1 ± 0.1</td>
<td>3.1 ± 0.1</td>
<td>3.1 ± 0.1</td>
</tr>
<tr>
<td><strong>Water Absorption</strong></td>
<td></td>
<td>%</td>
<td>0.2 ± 0.1</td>
<td>0.2 ± 0.1</td>
<td>0.2 ± 0.1</td>
<td>0.2 ± 0.1</td>
<td>0.2 ± 0.1</td>
</tr>
<tr>
<td><strong>Bulk Toughness</strong></td>
<td></td>
<td>GPa</td>
<td>20 ± 1</td>
<td>20 ± 1</td>
<td>20 ± 1</td>
<td>20 ± 1</td>
<td>20 ± 1</td>
</tr>
<tr>
<td><strong>Coefficient of Linear Thermal Expansion</strong></td>
<td></td>
<td>20°C - 100°C</td>
<td>0 ± 0.2</td>
<td>0 ± 0.2</td>
<td>0 ± 0.2</td>
<td>0 ± 0.2</td>
<td>0 ± 0.2</td>
</tr>
<tr>
<td><strong>Specific Heat Capacity</strong></td>
<td></td>
<td>J/kg°C</td>
<td>830 ± 10</td>
<td>830 ± 10</td>
<td>830 ± 10</td>
<td>830 ± 10</td>
<td>830 ± 10</td>
</tr>
<tr>
<td><strong>Heat Shock Resistance</strong></td>
<td></td>
<td>%</td>
<td>99 ± 1</td>
<td>99 ± 1</td>
<td>99 ± 1</td>
<td>99 ± 1</td>
<td>99 ± 1</td>
</tr>
<tr>
<td><strong>DIElectric Strength</strong></td>
<td></td>
<td>V/mm</td>
<td>11 ± 1</td>
<td>11 ± 1</td>
<td>11 ± 1</td>
<td>11 ± 1</td>
<td>11 ± 1</td>
</tr>
<tr>
<td><strong>Volatility</strong></td>
<td></td>
<td>%</td>
<td>0 ± 0.1</td>
<td>0 ± 0.1</td>
<td>0 ± 0.1</td>
<td>0 ± 0.1</td>
<td>0 ± 0.1</td>
</tr>
<tr>
<td><strong>Loss Factor</strong></td>
<td></td>
<td></td>
<td>0.05 ± 0.01</td>
<td>0.05 ± 0.01</td>
<td>0.05 ± 0.01</td>
<td>0.05 ± 0.01</td>
<td>0.05 ± 0.01</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td></td>
<td></td>
<td>Aluminum Nitride</td>
<td>Aluminum Nitride</td>
<td>Zirconia</td>
<td>Zirconia</td>
<td></td>
</tr>
<tr>
<td><strong>Young’s Modulus of Elasticity</strong></td>
<td></td>
<td>GPa</td>
<td>418.7 ± 10</td>
<td>418.7 ± 10</td>
<td>418.7 ± 10</td>
<td>418.7 ± 10</td>
<td>418.7 ± 10</td>
</tr>
<tr>
<td><strong>Vickers Hardness HV1</strong></td>
<td></td>
<td>MPa</td>
<td>14 ± 0.5</td>
<td>14 ± 0.5</td>
<td>14 ± 0.5</td>
<td>14 ± 0.5</td>
<td>14 ± 0.5</td>
</tr>
<tr>
<td><strong>Electrical Conductivity</strong></td>
<td></td>
<td>Ω·cm</td>
<td>100 ± 10</td>
<td>100 ± 10</td>
<td>100 ± 10</td>
<td>100 ± 10</td>
<td>100 ± 10</td>
</tr>
</tbody>
</table>

**Notes**
- These values are only for reference, showing the measurement results of test pieces specified.
- The values may change depending on the firing conditions and the shape of products.
- For more details, please refer to the catalog.
**Alumina Wafer Polishing Plate / Turn Table**
- Material: Al₂O₃
- Size: Up to 39” in diameter
- Features:
  - High rigidity
  - High chemical durability
  - Surface shape & roughness control

**Silicon Carbide Wafer Polishing Plate**
- Material: SiC
- Size: Up to 30” in diameter
- Features:
  - High thermal conductivity
  - Low thermal expansion
  - High rigidity

**Pad Dresser**
- Material: Al₂O₃, SiC, Si₃N₄
- Features:
  - High wear resistance
  - Square bumps / pyramid bumps

**Sapphire Carrier Plate**
- Material: Sapphire
- Size: Up to 8” in diameter
- Features:
  - High purity
  - High chemical durability
  - No grain boundary
  - Transparent

**Plasma Proof Dome**
- Material: Al₂O₃
- Size: For 200mm / 300mm equipment
- Features:
  - High purity
  - High plasma durability

**Plasma Proof Ring**
- Material: Al₂O₃, Y₂O₃
- Size: For 200mm / 300mm equipment
- Features:
  - High purity
  - High plasma durability

**Electro-Static Chuck**
- Material: Al₂O₃, AlN, Sapphire
- Size: For 200mm / 300mm equipment
- Features:
  - High purity
  - High plasma durability
  - Good chucking / de-chucking response
  - High temp. and low temp. application

**Heater**
- Material: AlN
- Size: For 200mm / 300mm equipment
- Features:
  - High purity
  - High plasma durability
  - Uniform thermal distribution
DEVICe MANUFACTURING PROCESS

Vacuum Chuck

- Material: Al₂O₃, Porous Al₂O₃, SiC
- Size: For 200mm / 300mm equipment
- Features:
  - High purity
  - High chemical durability
  - Vacuum channel inside
  - Variety surface shape

Nozzle

- Material: Al₂O₃
- Size: Nozzle diameter +/- 5 μm
- Features:
  - High plasma durability
  - Gas flow rate control

End Effector

- Material: Al₂O₃, SiC, Sapphire
- Size: For 200mm / 300mm equipment
- Features:
  - High purity
  - Vacuum channel inside
  - SiC coating
  - Mirror polished surface

Chamber Window & Tube

- Material: Sapphire
- Features:
  - High purity
  - High plasma durability
  - Transparent
  - High transmission factor

EPOCH-MAKING TECHNOLOGIES

USM Stage - Assembly Technology

- Material: Al₂O₃, Al, Non Magnetic Metal, etc.
- Features:
  - Ultrasonic Motor drive
  - High positioning accuracy
  - Compact design

Metalized Products - Metal Assembly Technology

- Material: Al₂O₃, Al, Stainless steel, etc.
- Application:
  - IC Packages
  - High vacuum component
  - High voltage terminal, etc.

Coating Technology

- Material: SiC, DLC, etc.
- Features:
  - Discharge of static electricity
  - Soft contact

Large Size Product Manufacturing Technology

- Material: Al₂O₃, Y₂O₃, SiC, Si₃N₄
- Application:
  - LCD manufacturing equipment
  - Lithography equipment

Material Development Technology

- Material: Low thermal expansion materials
- Application:
  - Lithography equipment
  - Wafer Inspection equipment