Yttrium Oxide Thermal Spray Powder

**High Purity Yttrium Oxide**
FUJIMI’s high purity yttrium oxide ( >99.99%) is an agglomerated and sintered composite powder of Y₂O₃ for thermal spray.

*Product feature>*
1. Free of splitting by powder classification technology and particle strength control
2. Designed for various types of Plasma Spray Guns to achieve higher deposition efficiency

**Purity of Yttrium oxide**
Yttrium oxide thermal spray coat is used in semiconductor and liquid-crystal-display (LCD) fabricating equipments, and demanded high purity more than 99.99% to prevent from contaminations. FUJIMI thermal spray powder are manufactured under very strict quality control, and supply our customer with yttrium oxide of high quality and purity.

**<Typical chemical composition>**

<table>
<thead>
<tr>
<th>Element</th>
<th>Y₂O₃</th>
<th>Fe</th>
<th>Na</th>
<th>Mg</th>
<th>Al</th>
<th>Si</th>
<th>K</th>
<th>Ca</th>
</tr>
</thead>
<tbody>
<tr>
<td>High purity Y₂O₃</td>
<td>&gt;99.99%</td>
<td>7</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>&lt;22</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

**Coating Characteristics**

**Plasma-erosion Properties of Yttrium Oxide Coating**
FUJIMI has investigated the erosion rate of yttrium oxide and aluminium oxide coatings under Ar/CF₄/O₂ and CF₄/O₂ plasma and the surface morphologies after the erosion test condition using reactive ion etching (RIE).

<table>
<thead>
<tr>
<th>No.</th>
<th>Material</th>
<th>Manufacturing method</th>
<th>Primary particle diameter (µm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB</td>
<td>Al₂O₃</td>
<td>Bulk</td>
<td></td>
</tr>
<tr>
<td>YB</td>
<td>Y₂O₃</td>
<td>Agglomerated and sintered</td>
<td>0.6, 2.9</td>
</tr>
</tbody>
</table>

1) Erosion rate of the plasma spray coatings

2) Surface morphologies after the erosion test

These results show :
• Yttrium oxide coating has higher anti-plasma erosion resistance than aluminium oxide coating.
• Within yttrium oxide spray coatings, although the erosion rates are almost same at both conditions, but surface morphologies are different, where eroded surface becomes smoother from Y1 to Y2. It shows that using larger primary particle is effective to retain smooth surface against plasma erosion.

Based on these results, FUJIMI’s yttrium oxide have been set the primary particle size approximately 3µm.

**Applications**

**Applications of high purity Yttrium Oxide**

- High purity (>99.99%)
- Chemical Stability
- Anti-plasma erosion resistance

**<Applications>**
- Plasma etch equipments
- CVD equipments
- ESC(Electrostatic chuck)

High purity yttrium oxide is applied in the semiconductor and liquid-crystal-display (LCD) production equipment with Anti-plasma erosion resistance.