

Technical Data

HA 4002

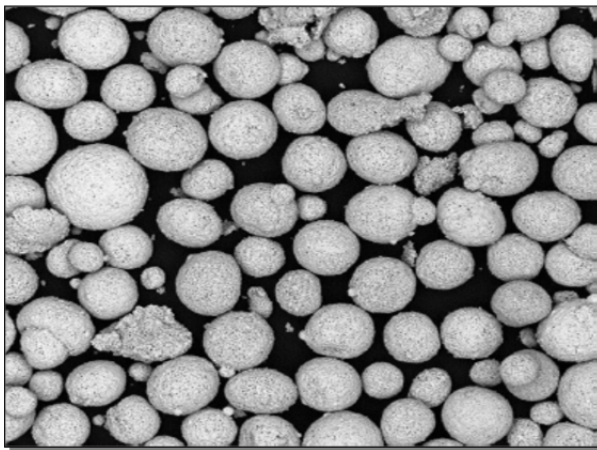
99.9% Y₂O₃ Powder

Product Code: 400102
 Technical Data Sheet

Revision: 003
 Dated: June 2014

HA 4002 series of powders are a high purity Yttrium Oxide (Y₂O₃) or (YO) powder specifically developed for semiconductor and flat-panel-display (FPD) production equipment. Specifically YO ceramic materials were developed to enhance material performance of anodized aluminum alloy materials against fluorine and oxygen plasma attack, as well serve as high voltage insulators.

HA 4002 POWDER CHARACTERISTICS



Typical Powder Morphology (SEM 500X)

By applying a ceramic-based surface protective layer, yttrium oxide (Y₂O₃) coating, onto the anodized surface of aluminum alloy chamber components there is an immediate improvement to the resistance of the anodized surface to corrosion and erosion by a factor of 5x over the anodized surface alone, particularly in the fluorine/oxygen plasma environment typically used in fabricating ICs. Yttrium oxide coatings produced by agglomerating fine YO particulates and sintering to form a fully crystalline cubic structure forms very dense YO coatings resulting in higher erosion resistance with a smoother eroded surface. The result is a reduction in replacement parts and tool up-time which decreases operational costs.

PHYSICAL PROPERTIES

Molecular Formula	Y ₂ O ₃
Melting Point [°F]/[°C]	2,690/1,462
Apparent Density [g/cm³] ASTM B212	1.2 - 1.5
Crystal Structure	Cubic

CHEMICAL ANALYSIS

Element	Weight Percent
Y ₂ O ₃	Bal.
Al ₂ O ₃	<0.01
CaO	0.01
Fe ₂ O ₃	<0.01
SiO ₂	0.01
Na ₂ O	<0.01
MgO	0.003

Typical chemistry of HA 4002-2 as shown

POWDER PARTICLE SIZE

D ₁₀	D ₅₀	D ₉₀
34 μm	47 μm	65 μm

Typical particle size of HA 4002-2 as shown

HA 4002 COATING PROPERTIES

Composition	>99.9%
Porosity [%]	1 - 2 max.
Hardness [DPH]	>500
Surface Finish [μin]	120
CTE [μm/m/°C]	8 - 9
Thermal Conductivity [W/m °K]	8 - 12
Tensile Strength [PSI]	>7,000

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