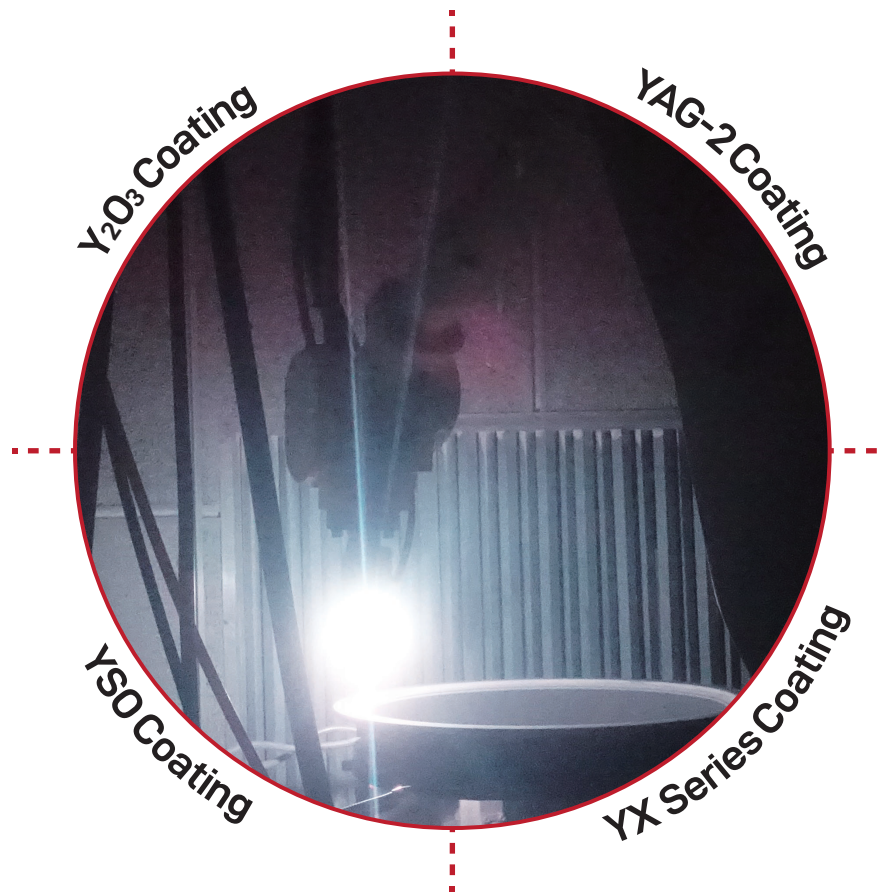


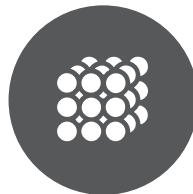
CINOS COATING TECHNOLOGY

14nm Etch Coating

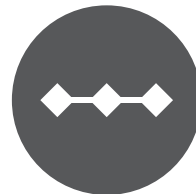
# APS



Plasma Flame



High Density



Steady Speed

**CINOS**

# About

Atmospheric plasma spraying ionizes incombustible gases such as argon, hydrogen, nitrogen, or helium in a special chamber to form the plasma composed of electrons, neutrons, and protons.

With the high temperature and high-speed plasma blown out of the chamber, a high-density coating film is formed by transferring the powder material in the flame at a uniform speed and melting and spraying power material on the substrate material.

**CINOS APS Coating can provide various coatings such as  $Y_2O_3$ , YX, YX-2 YAG-2, YSO, and provide a coating suitable for the characteristics of the semiconductor parts.**

# Application

By coating major parts such as liners, doors, and shields of **sub 14nm semiconductor etch facilities**, the lifetime of parts can be increased and by-products from the coating are minimized during the process to improve yield.



APS  $Y_2O_3$  coating is the most widely used corrosion-resistant coating which has a lower etching rate in a plasma environment compared to the substrate material of major semiconductor facilities such as Al and  $Al_2O_3$  and it can be applied to various facilities.

In the case of the APS YX Series, the  $YF_3$  and YOF coatings are applied to the etch chambers for the minimization of the by-products in semiconductor etching facilities. Especially, in the case of YX-2 (YOF) coating, the deposition formed after use in the chamber and the coating have similar components, so the generation of by-products is small.



YAG (Yttrium Aluminum Garnet) has a complex garnet structure with  $YO_3$ ,  $AlO_6$ , and  $AlO_4$ , so **its hardness is higher than that of  $Y_2O_3$  and YX and, therefore, has a low etching rate in a plasma environment.** CINOS YAG-2 Coating crystallographically has the YAM (Yttrium Aluminum Monoclinic) structure, which is a deformation phase of YAG, and the hardness of the

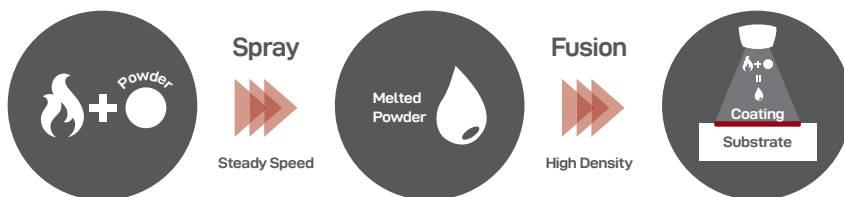
coating is similar to YAG. In the case of the pre-existing YAG, a bond coating was required due to the low bonding strength, but for YAG-2 coating, the single-layer coating is possible.

APS YSO coating has a **Si-O structure** in its structure, so its **hardness characteristics are the best among APS coatings.** In addition, it has **characteristics such as heat resistance, thermal integrity resistance, and low thermal expansion properties**, so it is used as a thermal barrier coating. So it has characteristics **suitable for high-temperature process facilities.**



	$Y_2O_3$	YX-1	YX-2	YAG-2	YSO
Hardness (Hv)	512	368	587	899	900
Adhesion (MPa)	5	5	5	6	9
Roughness ( $\mu$ inch)	200 $\pm$ 50	300 $\pm$ 50	200 $\pm$ 50	200 $\pm$ 50	200 $\pm$ 50
Porosity (%)	3~5 ↓	3~5 ↓	3~5 ↓	2	2

# Mechanism



**Best Solution**



**For Sub 14nm Etch Equipment**