

耐プラズマ表面処理／CVDイットリア

“High-purity CVD Yttria (Y_2O_3) Coating”

CVDイットリアは耐プラズマ性に優れた高純度保護膜です。

CVD Yttria is high-purity film which exhibits excellent resistance to F-based plasma.



Yttria coated window after 700 hours of use



Quartz glass window after 350 hours of use

■実装評価 Implementation Evaluation

用途 *Application* : View Port
 プロセス *Process* : Oxide Etching
 ガス *Gas* : CF_4+O_2
 初期膜厚 *Initial thickness of Y_2O_3 film* : 400nm

NOTE: Used view port without Yttria film is clouded by suffering damage from F gas.

■製品特長

- ▶ 耐プラズマ性に優れたイットリア膜で基材表面をカバー

CVD Yttria has excellent resistance property to plasma and causes the longer life of chamber parts.

- ▶ CVD法で密着性が高い緻密イットリア膜を形成

CVD method enables to cover substrates with high adherent and dense Yttria film.

- ▶ イットリア膜中の不純物含有量：Na, Cu, Fe, Al < 0.2 wt. ppm

CVD Yttria is high-purity material with low-impurity concentration.

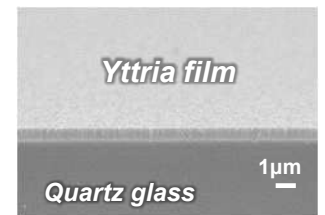
- ▶ 300mmウェーハプロセス対応

Applicable to chamber parts for 12"wafer process.

Product Features

■断面SEM写真

SEM Pictures of Cross-section



■耐プラズマ性試験結果

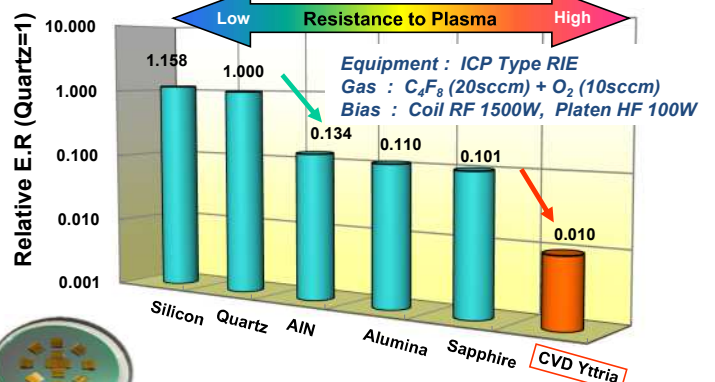
Resistance Property to Plasma

CVDイットリアはF系プラズマ耐性に優れた透明保護膜です。エッチング条件にもよりますが、CF系プラズマに対するCVDイットリアのエッチングレート（E.R.）は石英ガラスの約1/100です。SF₆に対しては更に耐性があります。

CVD Yttria provides high resistance to F-based plasma.

When compared with Quartz, the Etch Rate of CVD Yttria to CF plasma is 1/100. Even higher resistance property is expected to SF₆ plasma.

Etch rate mesurments for C_4F_8 -Plasma



上図は石英ガラスのE.R.を1として相対表示

In this figure, E.R. of each material is represented as relative value which is normalized by "Quartz=1".



湾曲した石英ガラス管の内面にコーティングした事例
Coating sample to inner wall of curved tubes.

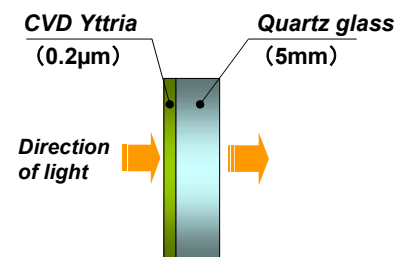
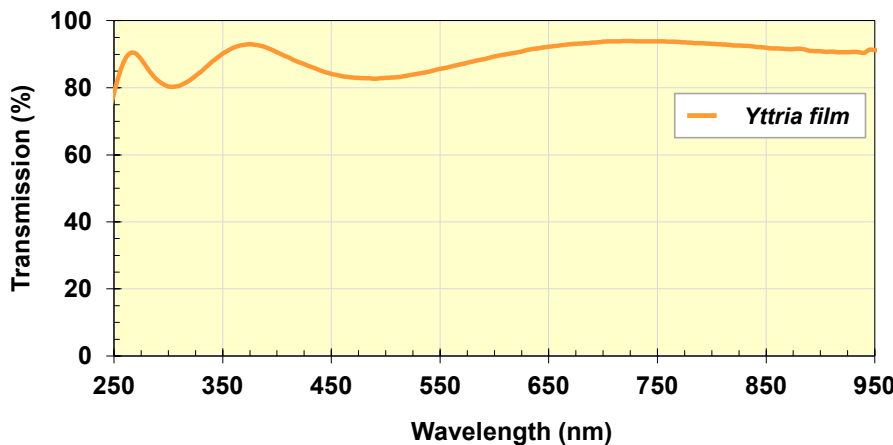


- ▶ 配管内面を腐食（侵食）から守る
Protecting inner wall of tubes from corrosion
- ▶ 優れた耐ハロゲン性
Excellent resistance to halogen gas
- ▶ コンタミ防止
Prevention of contamination
- ▶ CVD膜特有の高い密着性
High adhesion specific to CVD film

CVD method enables to cover inner wall of a quartz tube with high adherent and dense Yttria film.

		Yttria film	Yttria(Bulk)	Alumina(Bulk)	Quartz glass
Density	g/cm ³	5.0	4.9	3.9	2.2
Thermal Expansion Coeff. (40-400°C)	10 ⁻⁶ /°C	5-6	7.2	7.2	0.55
Dielectric Constant at 1MHz		11	11	9.9	3.75
Dielectric Strength	kV/mm	>24	11	15	50
Electrical Resistivity at RT	Ω·cm	1.6×10 ¹²	>10 ¹³	>10 ¹⁴	>10 ¹⁸

Typical Transmission



注記. 上記物性値は典型値であり、保証値ではありません。

NOTE: Properties are typical and should not be considered as specifications.