Introduction of **PARTICLE GETTER**

Sunric

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PARTICLE GETTER

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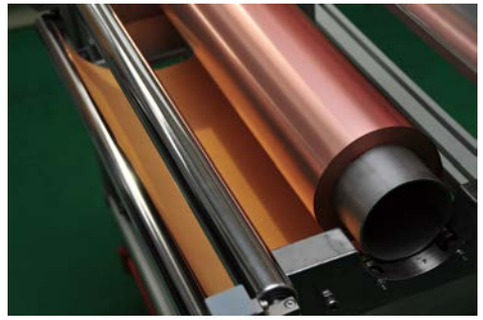


Company Information

Introduction of **PARTICLE GETTER**

Company name	Sunric Co,.Ltd.	
Representative	Takashi Yoshioka (President)	
Capital	20 million yen	
Established on	November 18, 1968	
Founded in	May 1942	
Location	Head Office/Plant	2-13-45 Fukuura, Kanazawa-ku, Yokohama, Kanagawa 236-0004 Tel : 045-522-8988 | Fax : 045-522-8992
Employees	115 (as of Sep 2017)	

Certified No. JQA-QM4321
Obtained February 2000

Certified No. JQA-EM5723
Obtained March 2007

Line of business

Introduction of **PARTICLE GETTER**

Vacuum evaporation parts for equipment

■Laser disk manufacturing equipment ■ Reflector manufacturing equipment ■Lens manufacturing equipment ■Crystal oscillator manufacturing equipment
■TIN(thin film) carbide tool manufacturing equipment ■Other equipments

Semiconductor equipment parts for equipment

■Ion implanation equipment ■MBE equipment ■MOCVD equipment (including LED) ■Cluster ion beam equipment
■Sputtering equipment ■Other equipments

Vacuum high-temperature heat-treated parts for equipment

■HIP furnace ■Vacuum brazing furnace ■Vacuum ceramic baking furnace ■Tantalium capacitor baking furnace ■Sapphire growth furnace
■Other furnaces

Special machined parts for equipment

■Ion implantation equipment ■HIP furnace ■Vacuum brazing furnace ■Vacuum ceramic baking furnace ■Other furnaces

※Sunric manufactures precision parts for various types of equipment and facillities using hard metals difficult to proces that have been drawn or otherwise processed.

Sputtering targets / shields

■LCD display manufacturing equipment ■Compact disk manufacturing equipment ■Magneto-optical disk manufacturing equipment
■Semiconductor manufacturing equipment ■Solar panel manufacturing equipment

Sale of materials [bas, plates, blocks and wires]

Tungsten	Molybdenum	Tntalum	Titanium	Nickel	Niobium
Stainless steel	Chromium	Inconel	High purity aluminum	Copper	

What is Particle Getter?

Particle Getter (PG) is a copper film, whose surface is specially processed, to be used as an alternative to AL spray in conventional spraying process.

The following effects have been demonstrated by putting the PG on the surface of the parts inside the equipment used for film formation.

1. Particle control (Adsorption of the particles by special surface processing)

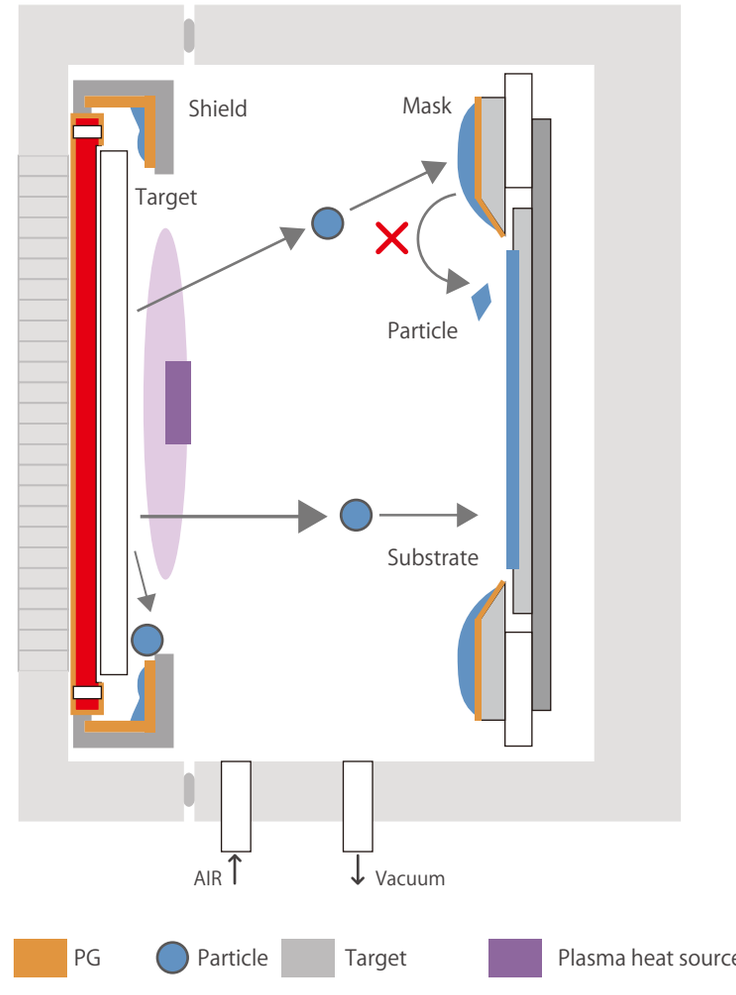
2. Controlling of the detachment of the films from the surface of the parts inside the equipment (reducing the residual stress of the attached films by embossment)

Material: Copper film (99.9% or more)
Na ≦ 0.1ppm, K ≦ 0.1ppm, U ≦ 0.001ppm, Th ≦ 0.001ppm

Surface processing: flat, embossment

Thickness: 210μm、140μm、70μm

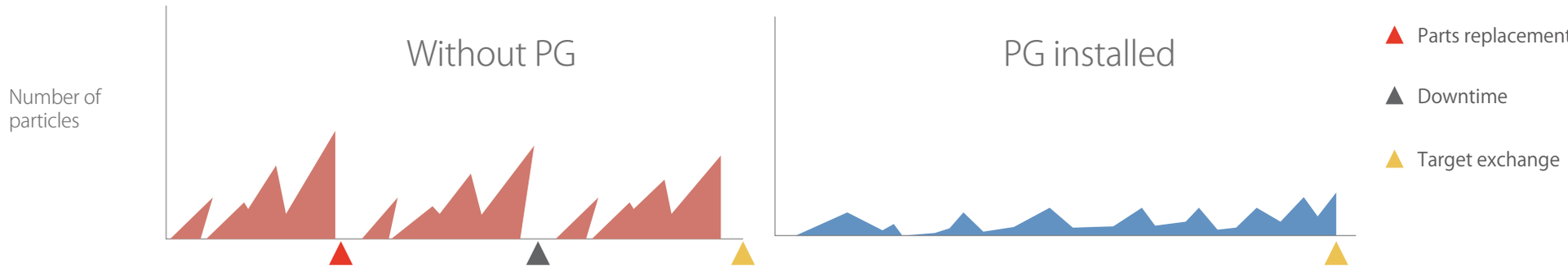
Schematic Diagram of the Equipment



Effects of PG

Introduction of **PARTICLE GETTER**

Target life



Reducing the detachment of the adsorbed film from the part surface

Present condition of the particle during spattering

Improving the yields

Reducing the frequency of replacement of the parts because of reduced particles

Reducing the downtime of the equipment

Reducing the wear of the parts, because film removal with chemicals is not performed

Longer life of the parts

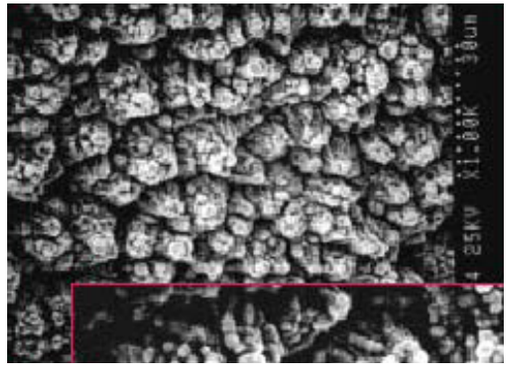
Reducing the costs

Increasing the rate of precious metal recovery

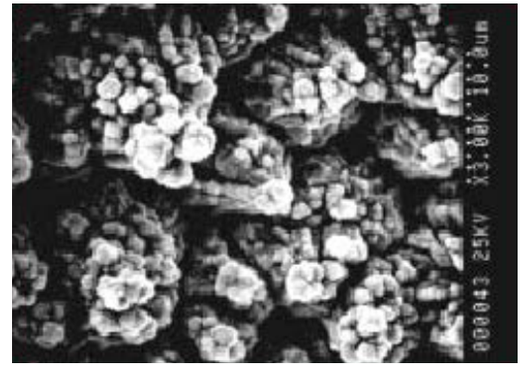
Stabilizing the production schedule, etc.

Characteristics of PG: Anchoring Effects

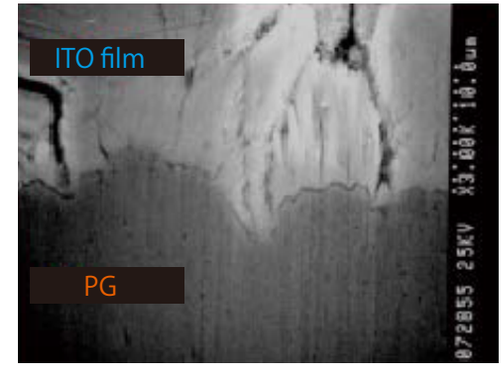
Schematic diagram of the effects of anchoring



Strong adhesion on
the PG/adsorbed film interface



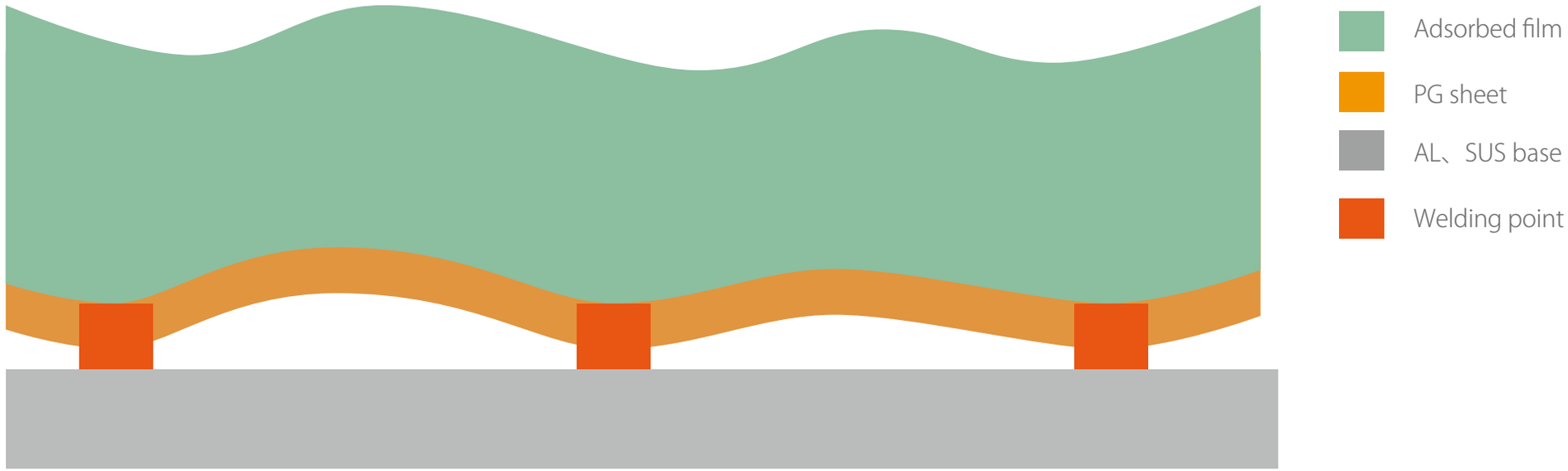
Unique surface condition
after PG/adsorption (SEM)



Cross-section view of PG/adsorbed film

Characteristics of PG:
Mitigation of the adsorbed film stress (1)

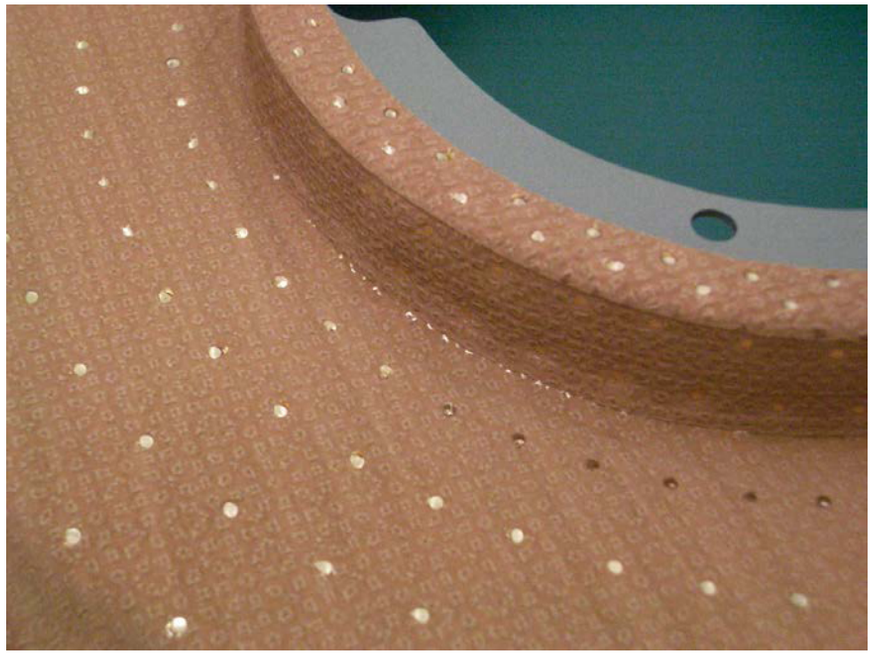
When the adsorbed film becomes thicker, the PG gets deformed between welding points, and thus, the stress in the adsorbed film is mitigated.



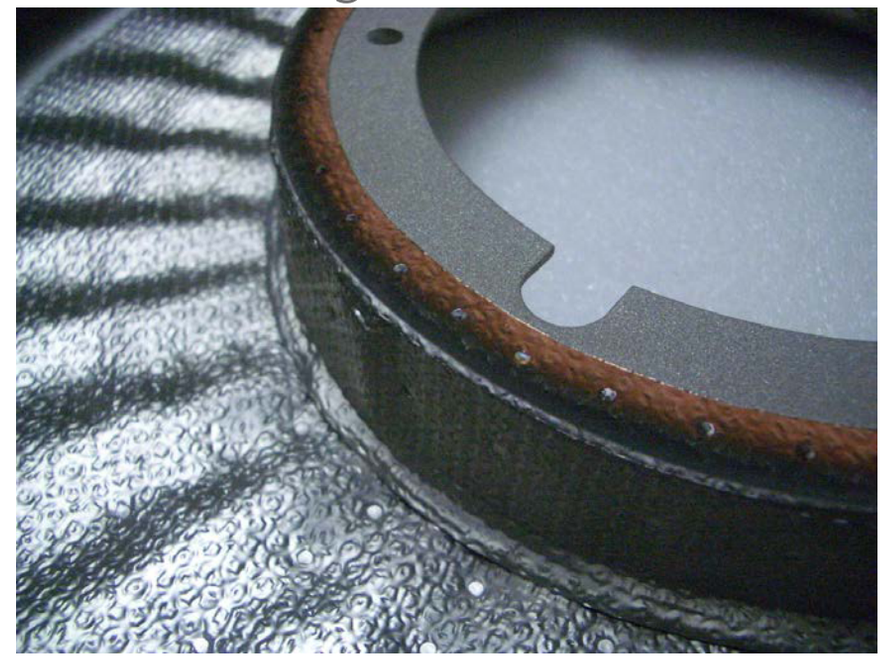
The PG and the part are joined only at the welding points.

Characteristics of PG:
Mitigation of the adsorbed film stress (2)

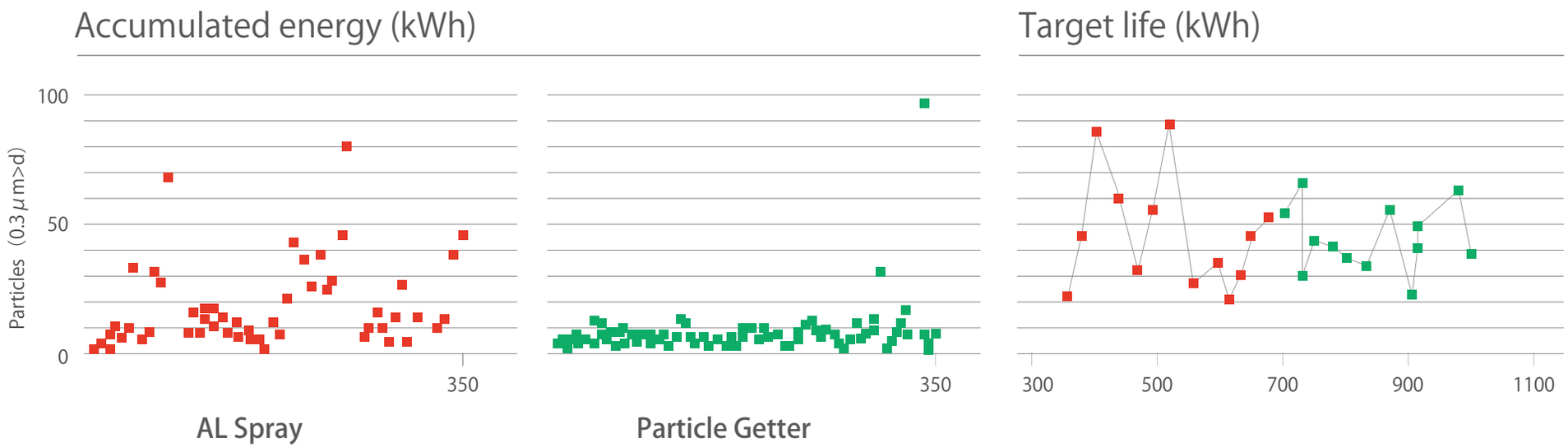
PG installed:
before forming the film



PG installed:
after forming the film



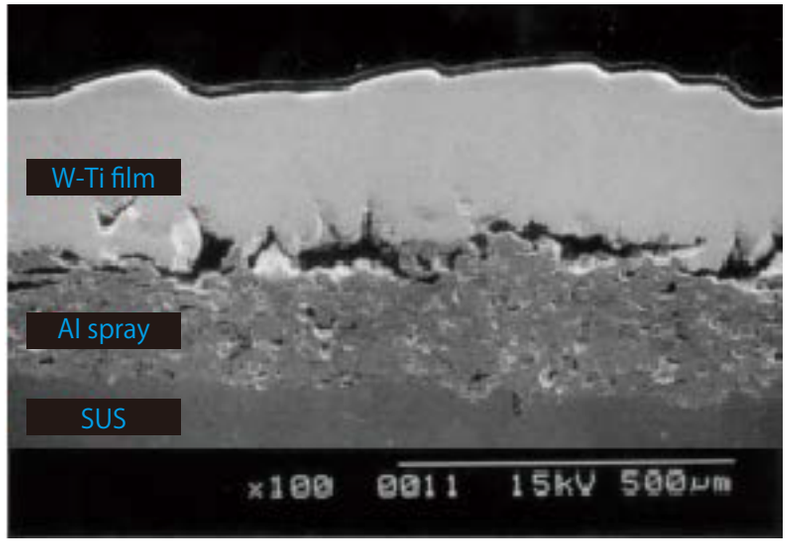
Comparison of PG and AL spray (1)



Data from MRC Eclipse, Ti/TiN process（＞0.3μ）

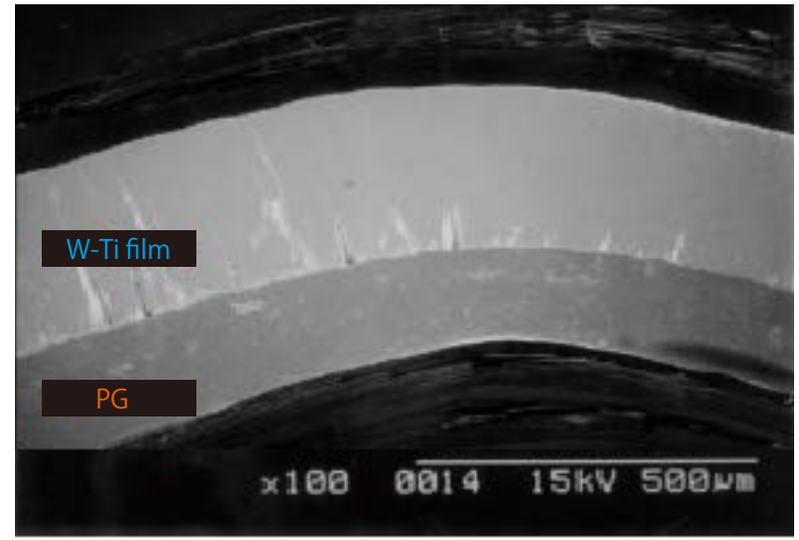
Comparison of PG and AL spray (2)

SEM adsorbed film: W-Ti



AL Spray

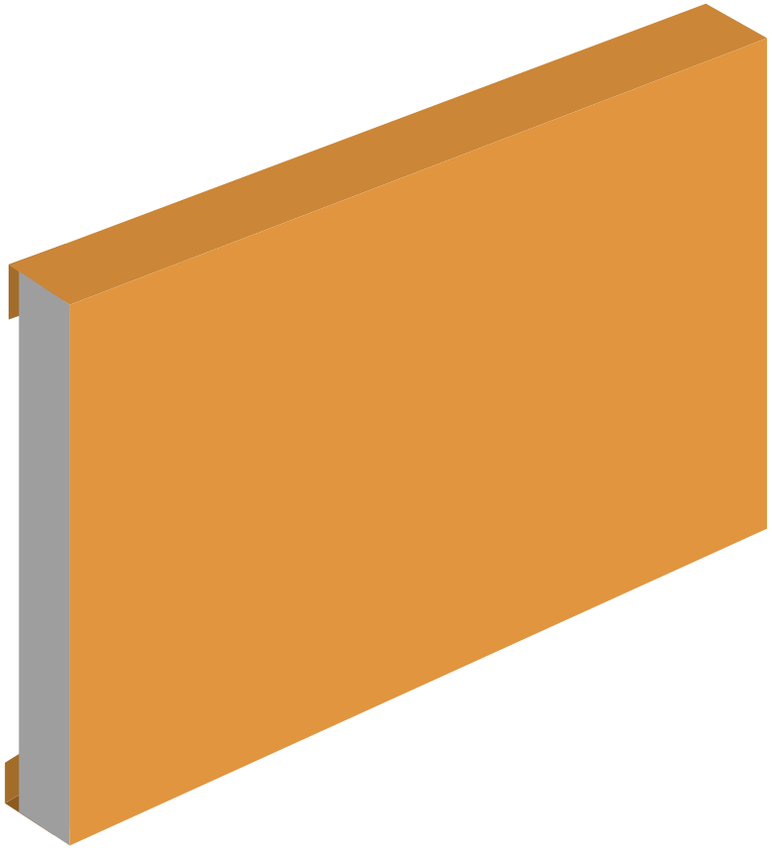
Surface of the sprayed aluminum part

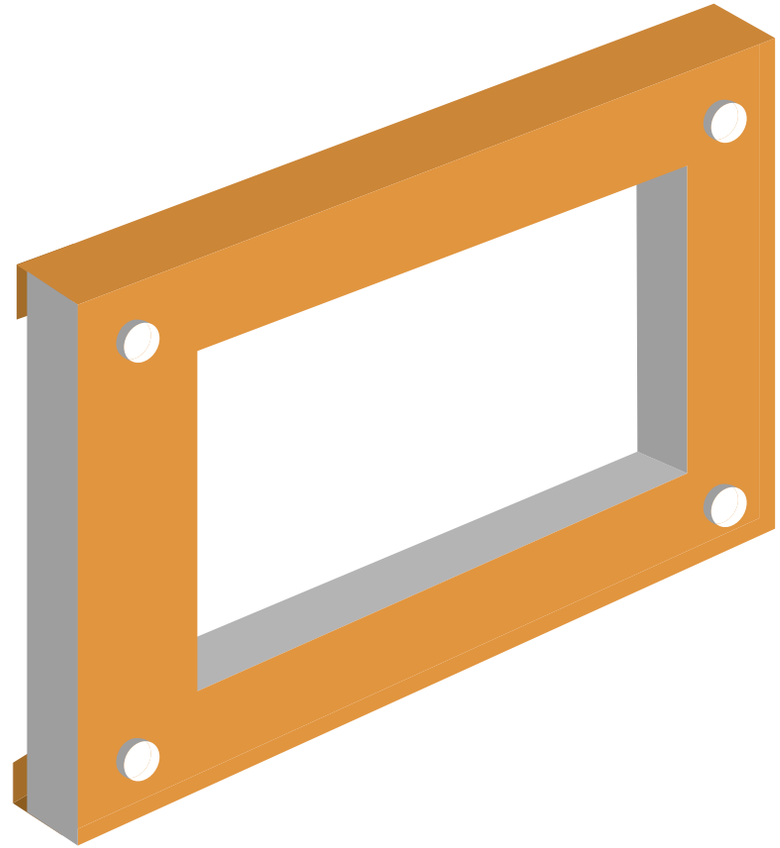


Particle Getter

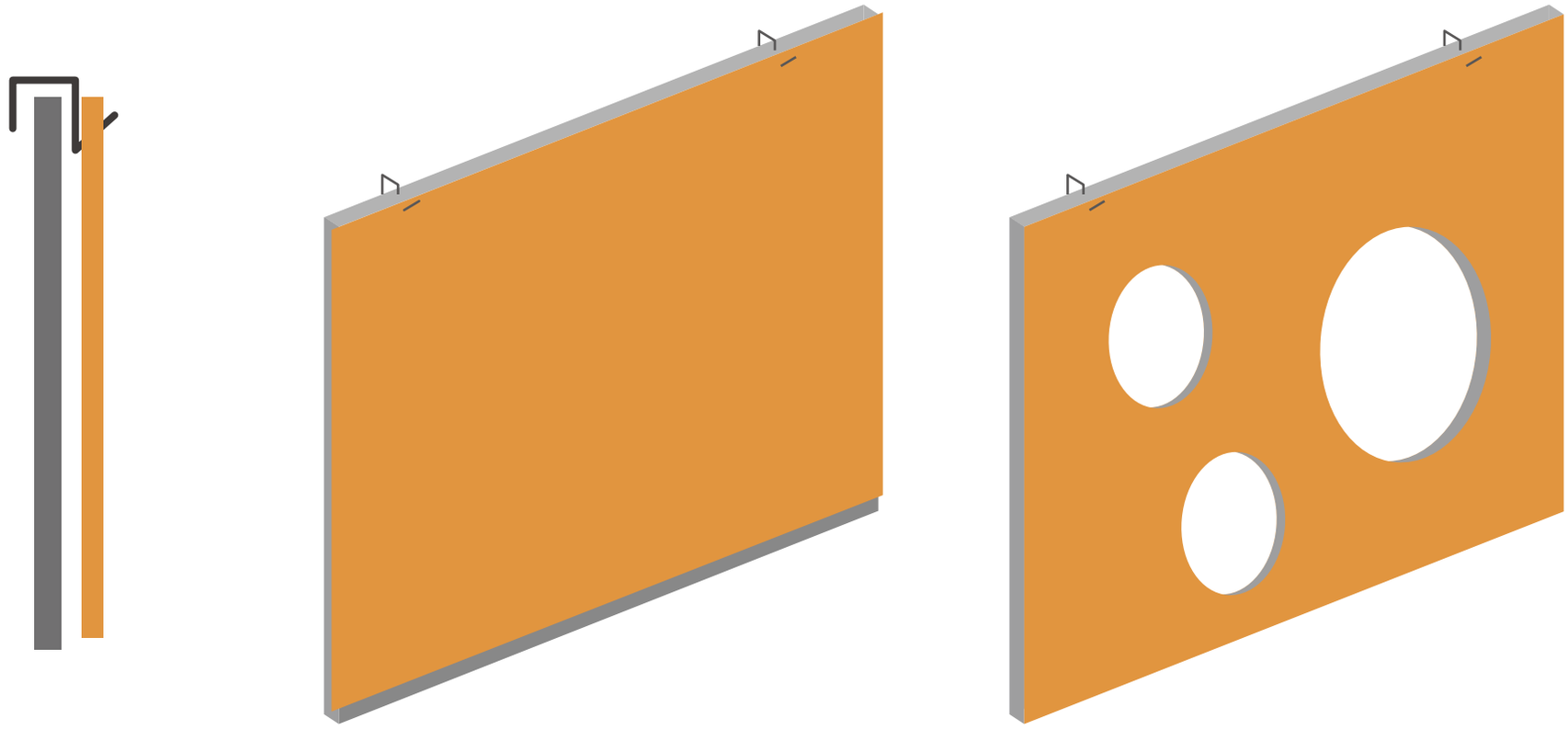
Surface of the aluminum part after PG processing

Example of the usage of PG: Bending

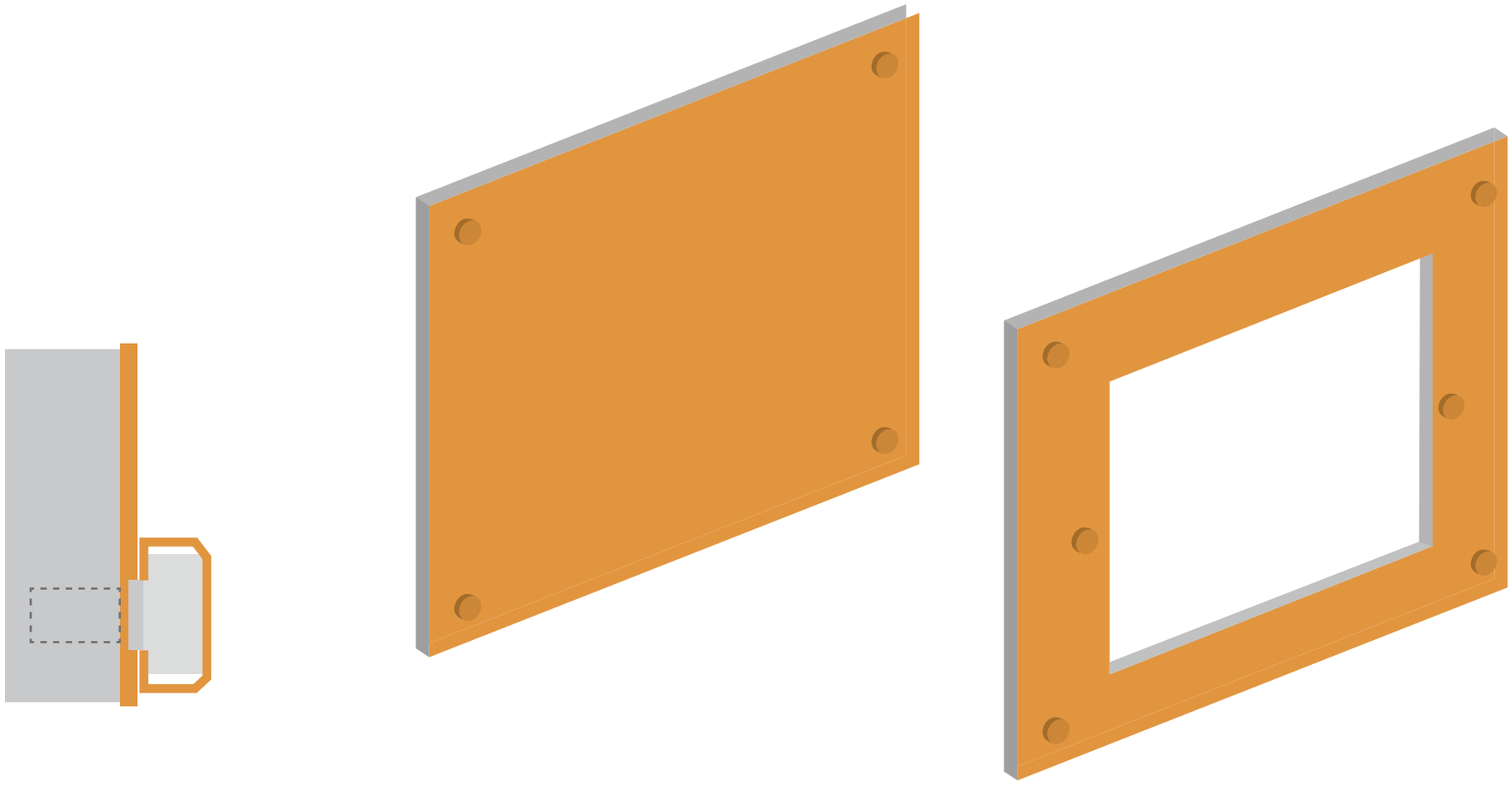




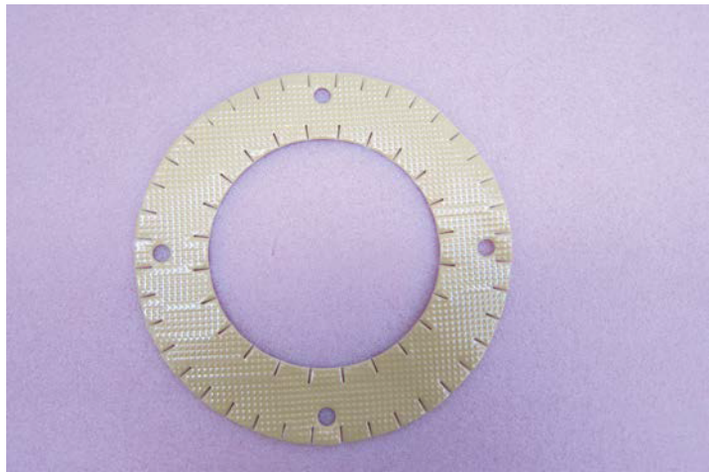
Example of the usage of PG: Wire clamping

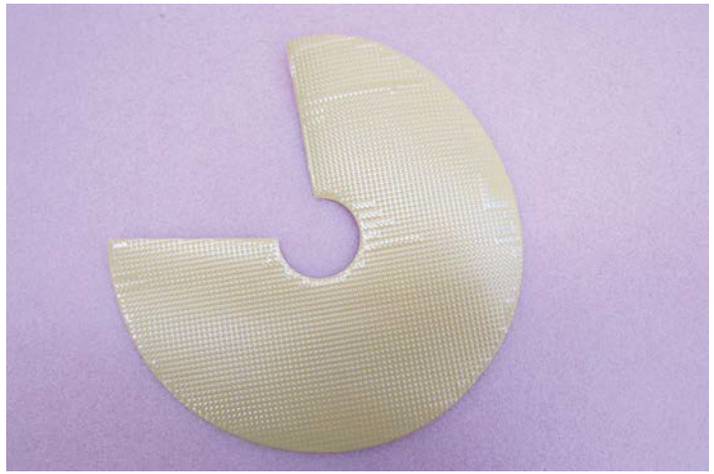


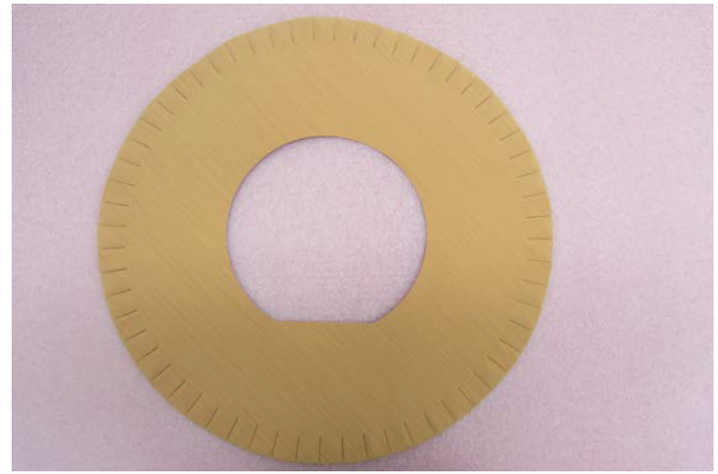
Example of the usage of PG: Screw clamping



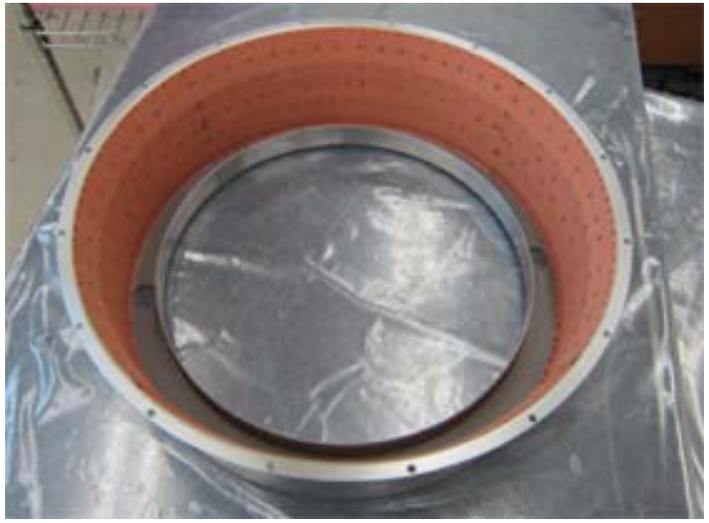
Example of the usage of PG: PG die cutting







Example of the usage of PG



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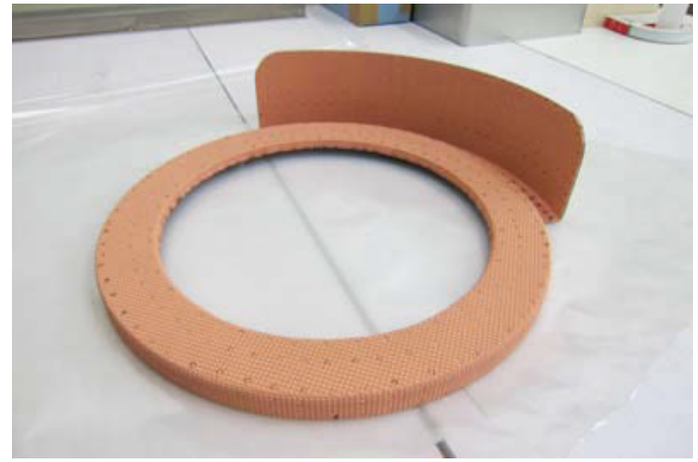
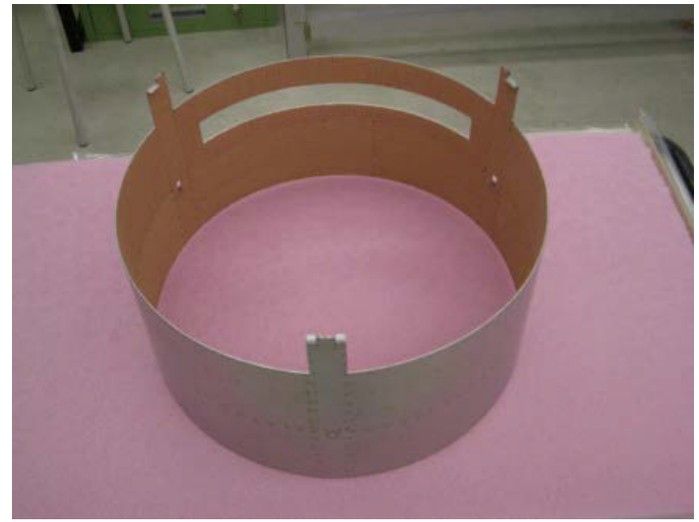




Using the PG: How to choose the optimal PG?

Points to be taken into consideration while choosing PG

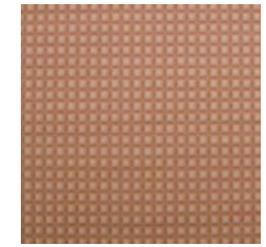
- ☑ Material to adsorb
- ☑ With or without clearance
- ☑ Thickness of the adsorbed film

It is necessary to choose the optimal type after actually installing it.

70 μ embossed PG
0.22 mm

140 μ softening, embossed PG
0.57 mm

210 μ flat PG
0.22 mm



210 μ embossed PG
0.85 mm

Major industries using PG, and examples of target materials

Precious metal　Oxide　Target material

Semiconductor	Liquid crystal	HDD	Crystal resonator
Ag	SiO2	Ru	SiO
Au	ITO	CoCrPtTaBr	Tio
Pt	TiO2	Cr	Tantalum pentoxide
W-Ti		DLC	MgF2
Ti			
Mo			
MoSi			

Customer feedback

Merit of PG(examples)

"Yield rate of semiconductor products improved."

"PG reforms better than previous situation that much dusts in bias sputtering prevents process."

"Parts life extends because blast processing to shield decreases."

"Retrieval rate of rare metal was improved as new merit."

Examples of PG installed equipment

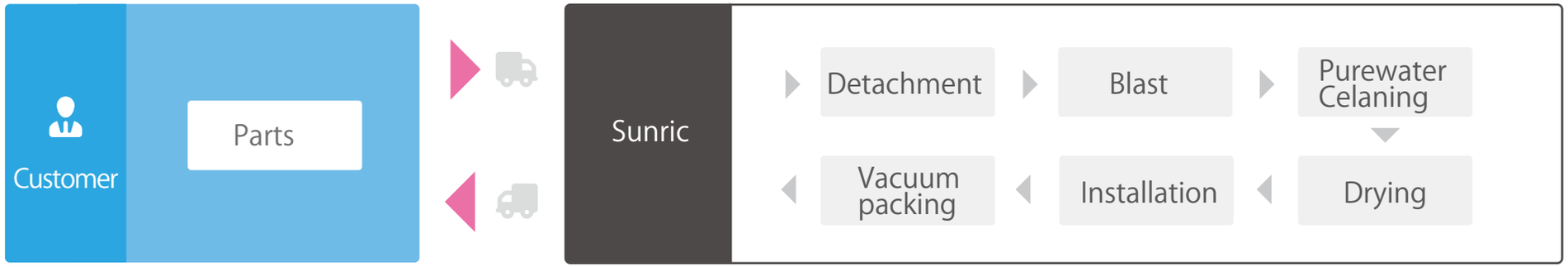
Maker / Model name	Model number		
UNVAC / Ceraus	4500	4800	9000
Anelva / ILC	1051	1060	—
Varian	3180	3290	—
Applied Materials / ENDUR	5500		

PG process steps

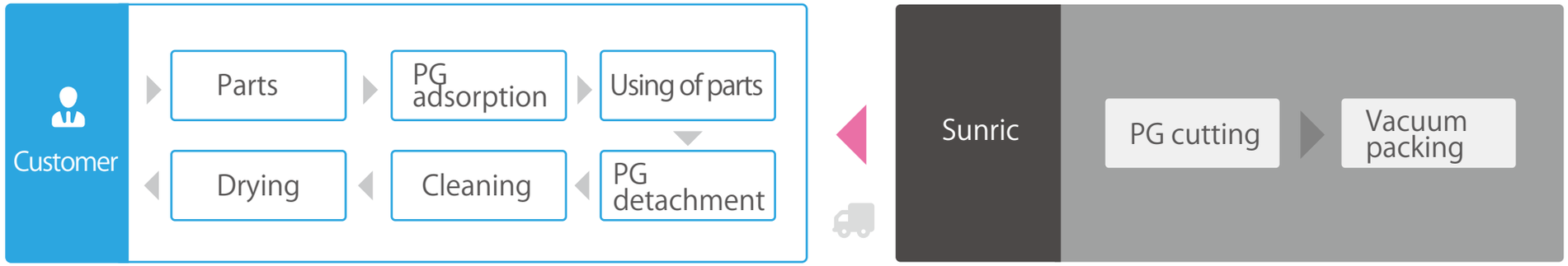
1. PG detachment
2. Blast treatment
3. Cleaning (purewater cleaning)
4. Drying
5. PG installation
6. Vacuum packing
7. Shipping
8. Delivery

Particle Getter process steps and logistics flow

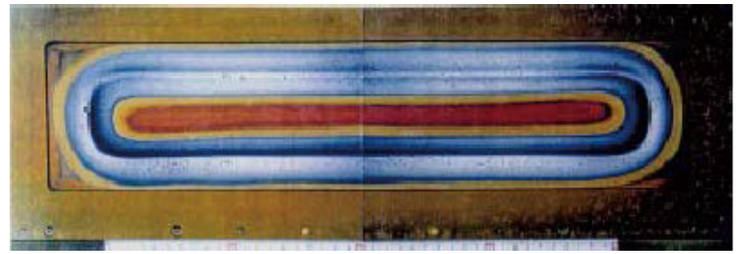
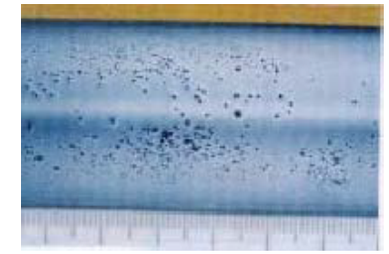
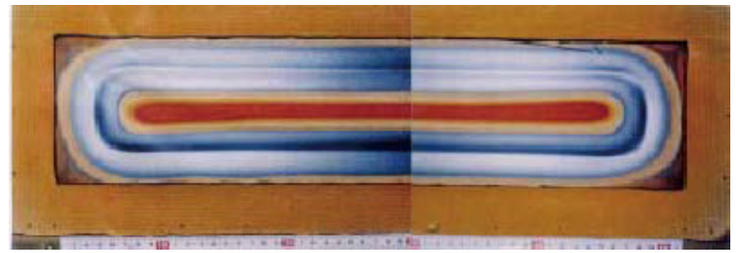
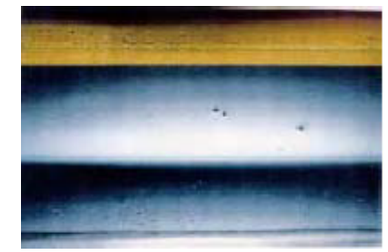
When the PG is installed at Sunric



When the PG installed by customer



Effects of the PG on the ITO film formation

	Surface after sputtering is competed	Erosion surface
Without PG		
PG installed		

Significant reduction of nodule identified by the use of PG

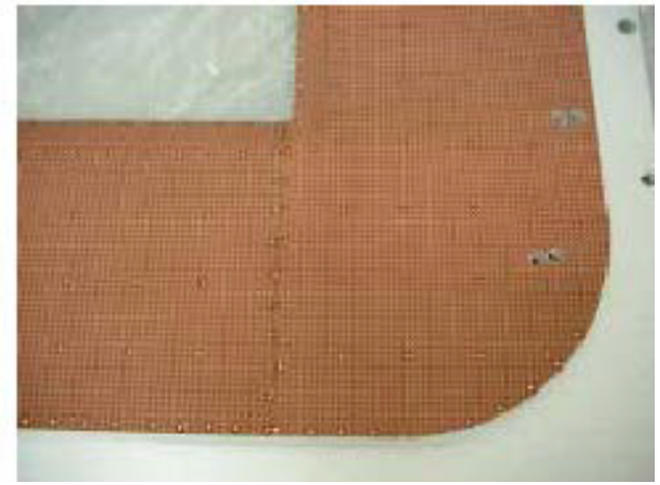
Reduced particles in the film formation due to PG

Target : ITO UHD-X grade

Power density : 1.0W / cm^2

Total Power Supply : 40whr / cm^2

Part after installing the PG



Part after film formation (ITO, MO)

ITO

MO