Brief Introduction of Zeon' s Plastic Material

Cyclo Olefin Polymer (COP)

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Introduction of Cyclo olefin polymer (COP)

What is COP?

Cyclo Olefin Polymer (COP) is
a high performance amorphous thermoplastic resin
chemically synthesized from special cyclic olefin monomers.

What is COP used for?

COP offers excellent optical properties (high transparency) for creating optical parts for cameras, electronic displays, blue-ray & laser equipment.

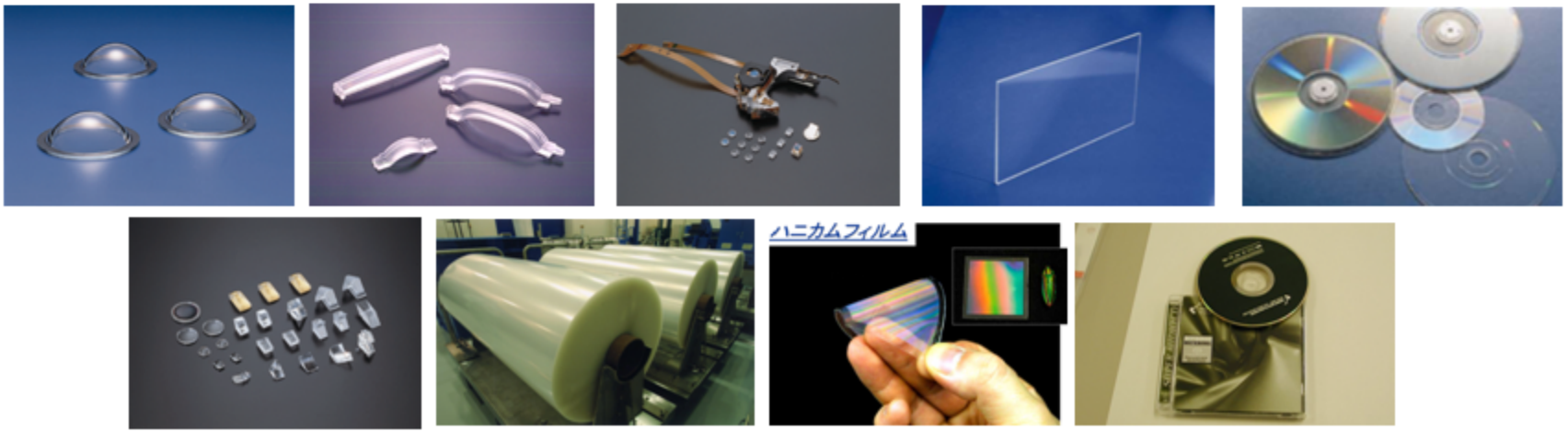
COP's high purity is suitable for a wide range of bio-medical parts like as packaging, bag, syringe, vial / bottle, vessel / plate / cell / chip for blood / DNA / protein diagnostic test.

COP has exceptional electric properties like as insulating capacity, low electric permittivity and loss to use for parts of high frequency antennas, connectors, and so on.

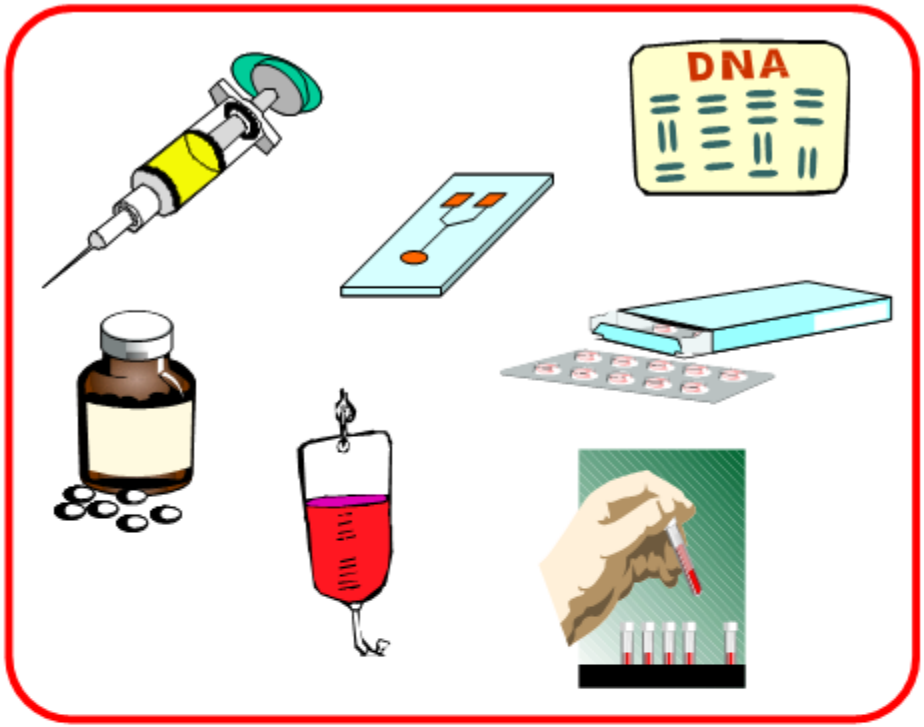
COP for Optical Application

Exceptional Properties:

- *Light weight*
- *Totally amorphous*
- *High heat resistance*
- *Low moisture absorption*
- *High transparency*
- *Low birefringence*
- *No fluorescing chromophore*
- *Good & fine moldability*
- *High purity*

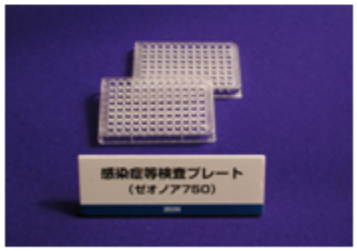


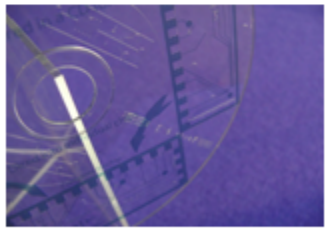
COP for Bio Medical Application

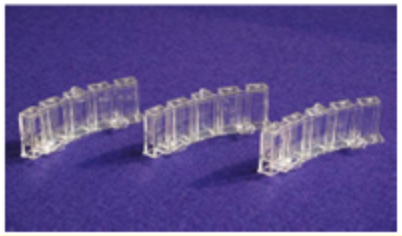


Exceptional Properties:

- *Light weight*
- *High heat resistance*
- *Low moisture absorption*
- *Low moisture vapor permeability*
- *High acid/base resistance*
- *High transparency*
- *Good & fine moldability*
- *Low protein adsorption*
- *No fluorescing chromophore*
- *High purity*
- *Incineration disposable*



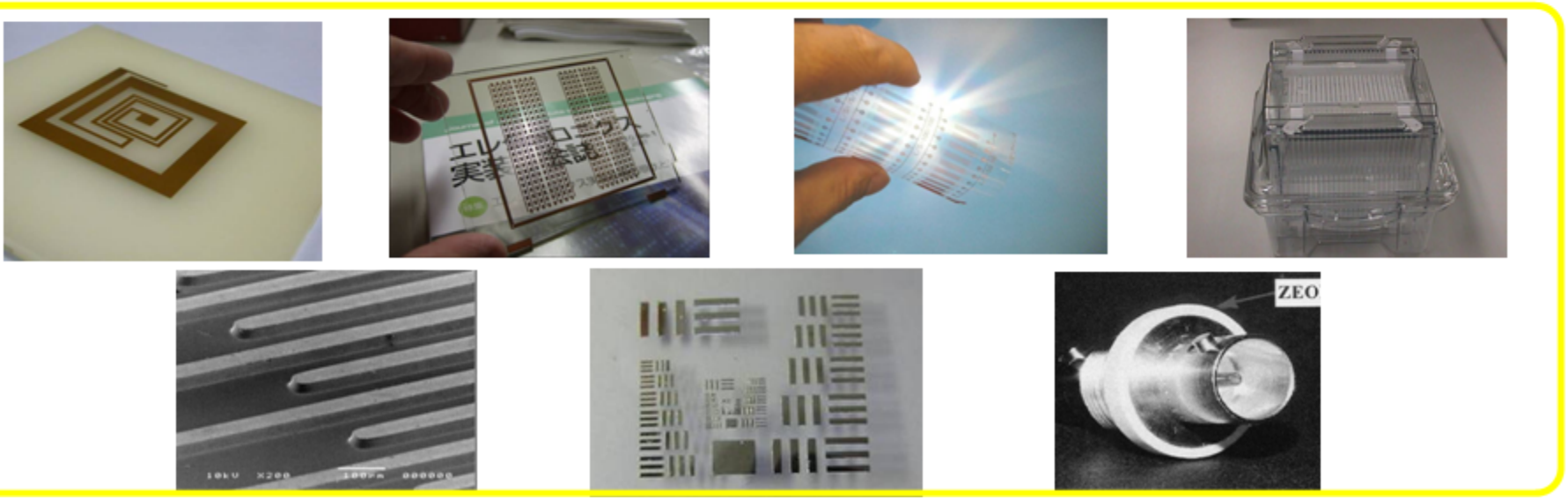




COP for Electronic Application

Exceptional Properties:

- *Light weight*
- *Low moisture absorption*
- *High acid/base resistance*
- *High transparency*
- *Good & fine moldability*
- *High purity*
- *Copper plating by UV process*



More COP Information –

Please come to the website at :

http://www.zeonex.com/

or contact by

Email: zeonex@zeonchemicals.com

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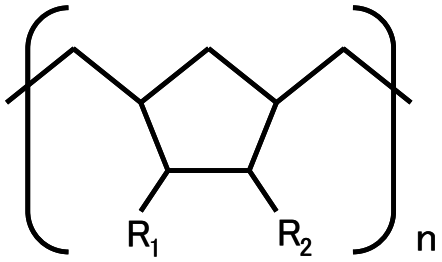
Europe: +49.211.5267.0

Applications

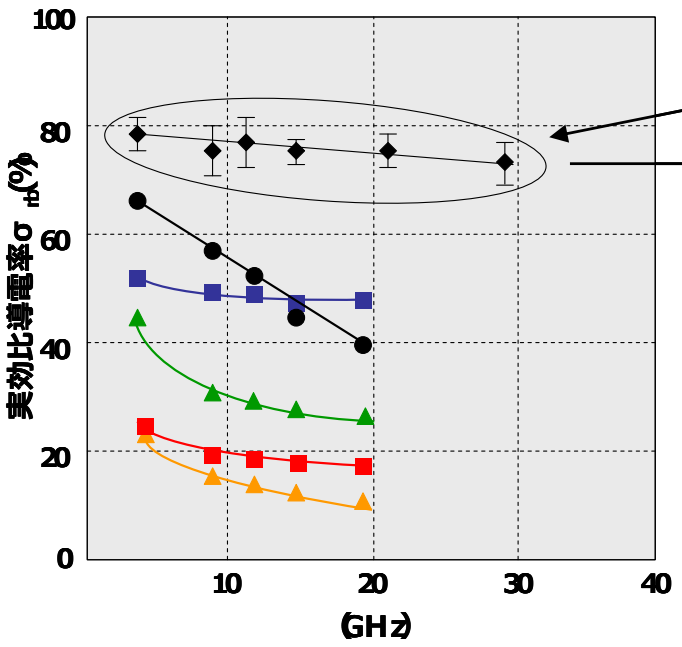
Cycloolefin Polymer

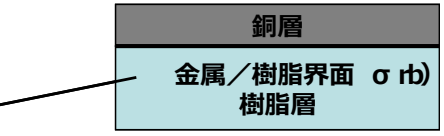


Characterization	COP	PTFE
Specific gravity	1.01	2.14～2.20
Water adsorption (%)	＜0.01	＜0.01
Dielectric constant【1.0GHz】	2.3	2.1
Dielectric dissipation factor【1.0GHz】	0.0003	0.0002

Excellent electrical property!!

Observation of Surface conductivity by MIC



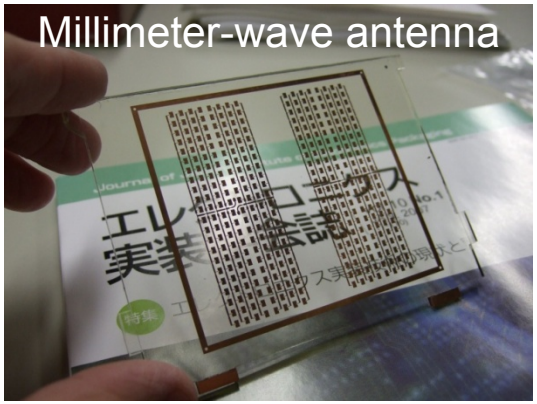


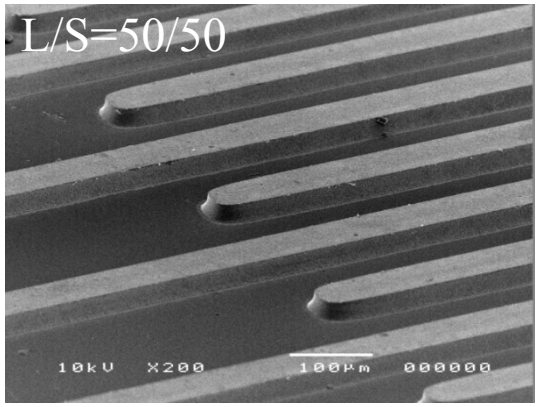
COP上平滑銅めっき
(ZF-16)

界面導電率
COP＞ フッ素樹脂

- COP ZF-16 (本手法による)
- COP RS420
- 市販国産高周波材料 (B社フッ素)
- 市販海外高周波材料 (フッ素)
- 市販国産高周波材料 (A社フッ素)
- 市販国産高周波材料

測定 :サムテック (有) / 埼玉大学





UV irradiation process model

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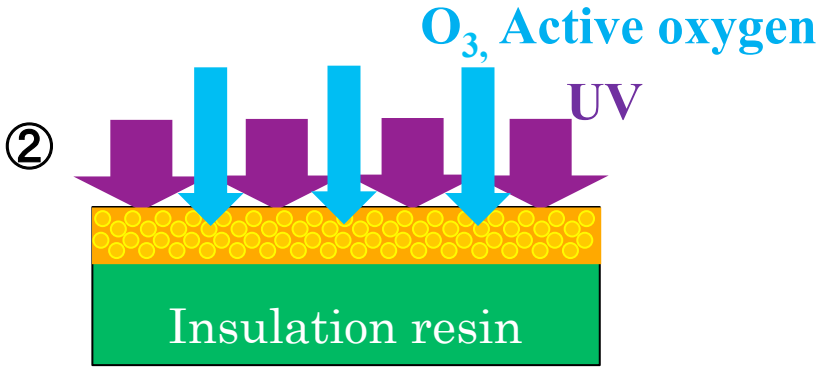
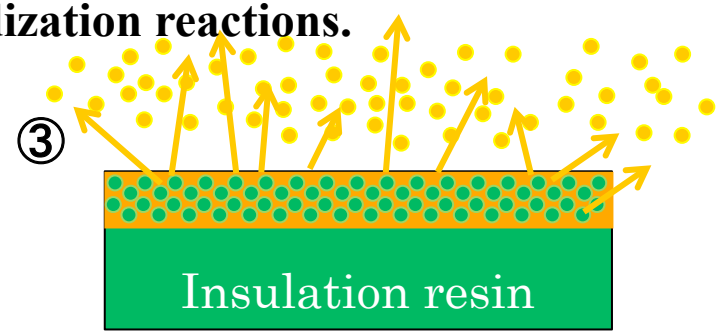
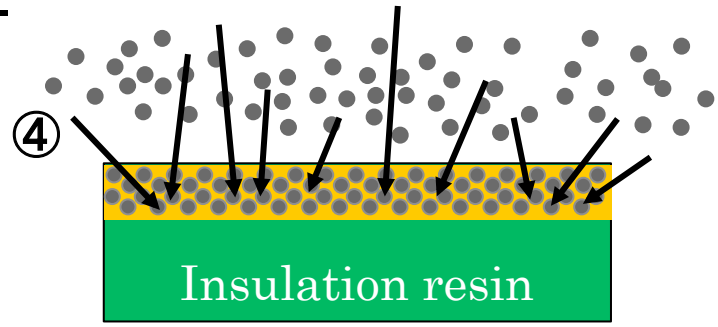


Insulation resin is oxidizing by UV light and Ozone gas. Polymer chain is cut by oxidization reactions.



Because, the cleaved surface of the insulating resin has a low molecular weight, it dissolves in alkaline degreaser.



The catalyst penetrate into the nano-sized voids.

Then, the electroless deposition reaction is started in nano-sized void.

From these results, adhesion is based on the nano-level anchor effect by the diffusion of deposited copper metals into the nano-void layer in the resin.

Formation of nano-void layer.

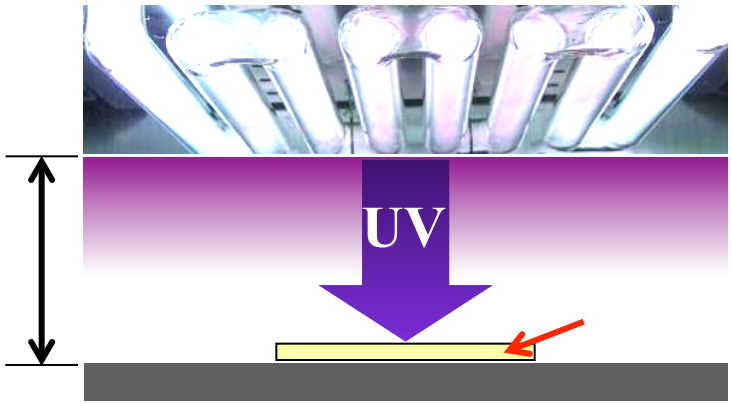
Experimental procedure

UV irradiation	Accelerating
▽	▼
Alkaline degreasing	Electroless Ni plating
▼	▼
Conditioning	Electroless Cu plating
▼	▼
Catalizing	Heat treatment
▼	

▼ : Water rinsing ▽ : No water rinsing

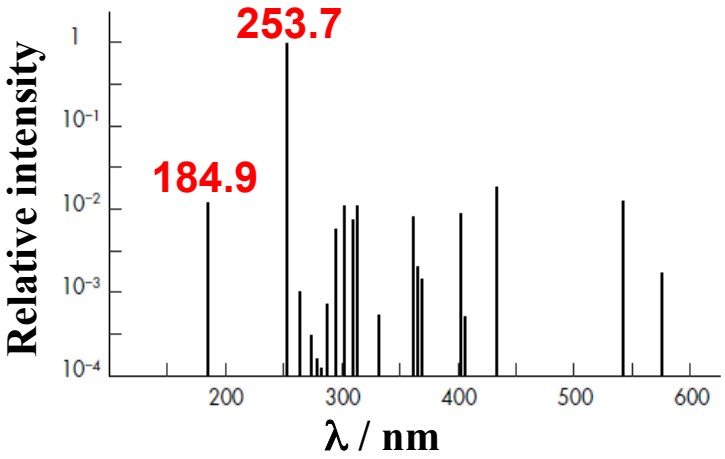
UV Irradiation Process

Low pressure Hg lamp



Distance from UV lamp: 15 mm

Light power density: 30 mW/cm^2



Typical spectrum of low pressure Hg lamp

Generation and Decompose of Ozone

$O_2 + h\nu\ (184.9\ nm) \rightarrow 2O(^3P)$

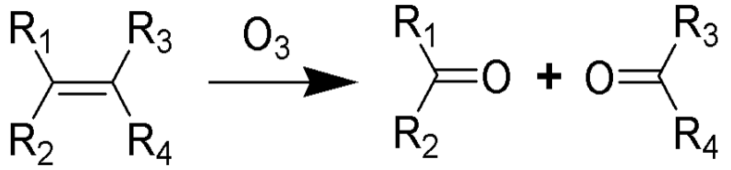
$O_2 + O(^3P) \rightarrow O_3$

$O_3 + h\nu\ (253.7\ nm) \rightarrow O(^1D) + O_2$

$O(^3P)$: ground state triplet atomic oxygen

$O(^1D)$: singlet atomic oxygen

Ozonolysis



Epoxy resin, Polyimide, Polyamide, ABS resin,

LCP film , COP film and other substrate