

碳氫樹脂 熱固性苯乙烯共聚物

Hydrocarbon Resin
Thermosetting Styrene Copolymer

特 長

Features

- 芳香族分子
- 間規聚合物
- 光硬化
- 熱硬化
- 低介電損失

- Aromatic molecules
- Syndiotactic polymer
- UV curing
- Thermosetting
- Low dielectric loss



PS-T

PS-O

用 途

Applications

- 高速・高頻基板
- AI 伺服器
- 毫米波雷達
- 衛星接收站
- 天線
- 基地台

- High speed & frequency substrate
- Artificial intelligence server
- Millimeter wave radar
- Satellite ground station
- Antenna
- Base station



特 性

Properties

PP-V /Wt	PS-O /Wt	PS-T /Wt	Tg /°C	Td3 /°C	Td5 /°C	Dk (10GHz)	Df (10GHz)
100	0	0	208	342	373	2.35	0.0041
80	20	0	194	340	372	2.32	0.0033
70	30	0	178	313	360	2.27	0.0025
80	0	20	207	350	377	2.32	0.0035
70	0	30	206	353	379	2.26	0.0027

PP-V: PPO resin varnish

Item	Unit	PS-O	PS-T
Tm	°C	131	98
Mw		20250	27550
Mn		518	2346
Solvent		TOL	TOL
Td3	°C	261	285
Df(10GHz)		0.0005	0.0007

以上資訊為敝司的測試結果，建議使用者根據需要自行測試和驗證

The above information is the test results of our company, users are advised to test and verify according to their needs.

碳氫樹脂

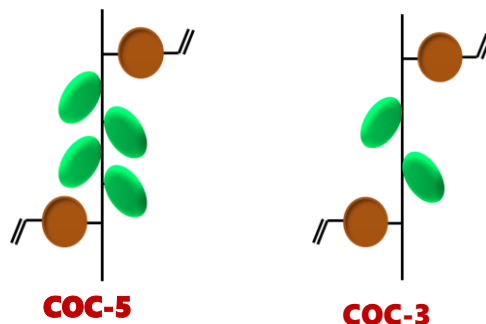
熱固性環狀烯烴共聚物

Hydrocarbon Resin
Thermosetting Cyclic Olefin Copolymer

特 長

Features

-  **生質來源** Biomass-derived
-  **熱硬化** Thermosetting
-  **嵌段共聚物** block copolymer
-  **異種結合** Heterogeneous bonding
-  **光硬化** UV curing
-  **超低介電損失** Ultra-low dielectric loss



用 途

Applications

-  **毫米波雷達** Millimeter wave radar
-  **高速・高頻基板** High speed & frequency substrate
-  **密着材料** Adhesive material
-  **天線** Antenna
-  **光通信材料** Optical communication materials



特 性

Properties

應 用 例

Examples

PP-V /Wt	COC-5 /Wt	COC-3 /Wt	Tg /°C	Td3 /°C	Td5 /°C	Dk (10GHz)	Df (10GHz)
100	0	0	208	342	373	2.35	0.0041
80	20	0	205	329	361	2.32	0.0033
70	30	0	203	326	350	2.27	0.0027
80	0	20	221	334	369	2.31	0.0034
70	0	30	226	325	365	2.23	0.0029

PP-V: PPO resin varnish

Item	Unit	COC- 5	COC- 3
Tm	°C	95	73
Mw		32470	38390
Mn		2842	1250
Biomass C	%	67	59
Solvent		TOL	TOL
Td3	°C	298	278
Df(10GHz)		0.0007	0.0008

以上資訊為敝司的測試結果，建議使用者根據需要自行測試和驗證

The above information is the test results of our company, users are advised to test and verify according to their needs.

碳氫樹脂 熱固性芳香烯烴共聚物

Hydrocarbon Resin
Thermosetting Aromatic Olefin Copolymer

特 長

Features

- 高耐熱性** High heat resistance
- 完全溶於甲苯** Completely soluble in toluene
- 自我架橋** Self cross-link
- 與BVPE相容性佳** Good compatibility with BVPE
- 無起始劑可固化** Curable without initiator
- 低介電損失** Ultra-low dielectric loss

用 途

Applications

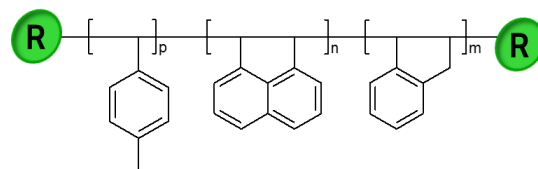
- 毫米波雷達** Millimeter wave radar
- PPO 替代品** PPO Alternatives
- 密着材料** Adhesive material
- AI 伺服器** AI Server
- 低軌衛星** Low-orbit satellite

應 用 例

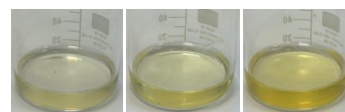
Examples

PP-V /Wt	MT-1 /Wt	MT-2 /Wt	MT-3 /Wt	Tg /°C	Td3 /°C	Dk (10GHz)	Df (10GHz)
100	0	0	0	208	342	2.35	0.0041
70	30	0	0	203	324	2.34	0.0029
70	0	30	0	205	310	2.39	0.0032
70	0	0	30	227	313	2.38	0.0030

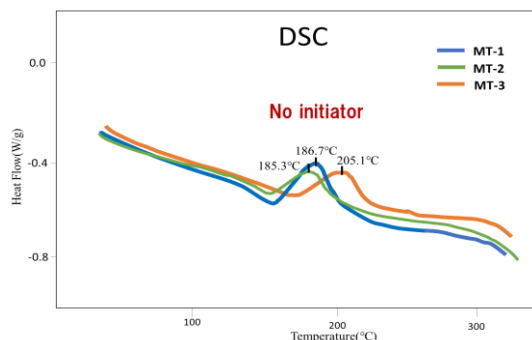
PP-V: PPO resin varnish



Dissolved in toluene



MT-1 MT-2 MT-3



特 性

Properties

Item	MT-1	MT-2	MT-3
Mw	13530	13833	15904
PDI	4.34	5.53	4.34
固化溫度	186°C	185°C	205°C
Df (10GHz)	0.0006	0.0008	0.0007
Item	MT系	COC系	PS系
溶解性	◎	○	○
耐熱性	◎	○	○
透明性	△	◎	○
低溫固化	◎	○	△

以上資訊為敝司的測試結果，建議使用者根據需要自行測試和驗證

The above information is the test results of our company, users are advised to test and verify according to their needs.

5G 通訊絕緣材料 低介電分子接合劑

5G Communication Insulation Material
Low Dielectric Molecular Bonding Agent

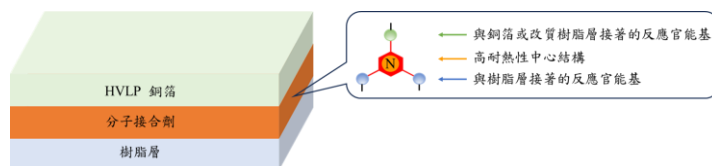
開發品

特長

Features

- 低介電損失
Low dielectric loss
- 低介電常數
Low dielectric constant
- Toluene溶解度佳
Excellent solubility in toluene
- 高耐熱
Excellent heat resistance
- 異質接合
Heterogeneous bonding

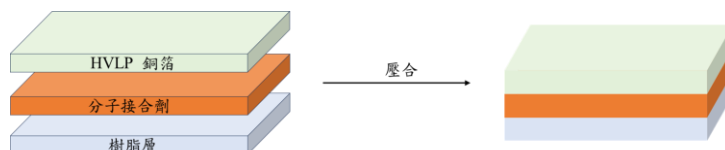
次世代分子接合劑



用途

Applications

- 高速高頻基板
High speed & frequency substrate
- 銅箔基板
Copper Clad Laminate
- AI伺服器
Artificial intelligence server



特性

Properties

Item	MB001	MB002	MB003	MB004	MB005	MB006	Note
Solvent	Toluene	Toluene	Toluene	Toluene	Toluene	Toluene	
NV / %	~ 60	~ 60	~ 60	~ 60	~ 60	~ 60	
Td5 / °C	404	401	411	407	383	383	TGA
Tg / °C	199	166	181	246	240	209	DMA
Tg / °C	202	169	180	243	243	208	TMA
CTE	64	93	75	76	76	67	TMA
Dk	2.52	2.59	2.65	2.55	2.62	2.50	10 GHz
Df	0.002	0.001	0.002	0.002	0.002	0.002	10 GHz

- 純膠建議烘烤條件：預烤150~170°CX30min，硬化溫度230°CX180min
- 固型份檢測條件：180°CX35min
- 資料來源：岩手大學

以上資訊為敝司的測試結果，建議使用者根據需要自行測試和驗證
The above information is the test results of our company, users are advised to test and verify according to their needs.

5G 通訊絕緣材料

低漲縮高溶解度交聯劑

5G Communication Insulation Material
Low CTE High Solubility Cross Linker

特 長

Features

- 低介電損失
Low dielectric loss
- 低介電常數
Low dielectric constant
- MEK/Toluene溶解度佳
Excellent solubility in MEK/Toluene
- 高耐熱
Excellent heat resistance
- 低漲縮
Low CTE



用 途

Applications

- 高速高頻基板
High speed & frequency substrate
- 銅箔基板
Copper Clad Laminate
- AI伺服器
Artificial intelligence server

溶 解 度

Solubility

Item	MEK	Toluene	NV(%)
LC001	○	○	60 ~ 70
LC002	○	○	60 ~ 70
LC003	○	○	60 ~ 70
LC004	○	○	60 ~ 70
LC005	○	○	60 ~ 70
LC006	○	○	60 ~ 70
LC007	○	○	60 ~ 70

固型份檢測條件：180°CX35min

應 用 例

Examples

Item	PPO Ref	TAIC	LC001	LC002	LC003	LC004	LC005	LC006	LC007	Note
Td5 / °C	398	385	368	381	396	380	339	400	382	TGA
Tg / °C	221	230	197	200	263	237	211	238	245	DMA
Tg / °C	210	183	181	188	172	183	185	185	181	TMA
CTE	194.8	206.0	183.5	181.9	169.4	166.8	162.6	132.6	156.3	TMA
Dk	2.56	2.52	2.56	2.56	2.41	2.56	2.50	2.56	2.46	10 GHz
Df	0.00479	0.00583	0.00406	0.00548	0.00556	0.00615	0.00568	0.00676	0.00465	10 GHz

1、Composition：PPO/Cross-linker/Initiator =85/15/0.5 wt

2、純膠建議烘烤條件：預烤150~170°CX30min，硬化溫度230°CX180min

以上資訊為敝司的測試結果，建議使用者根據需要自行測試和驗證

The above information is the test results of our company, users are advised to test and verify according to their needs.

5G/6G 通訊光學材料 可溶型透明聚醯亞胺樹脂

5G/6G Communication Insulation Material
Soluble Colorless Polyimide Resin

特 長

Features

- 高耐熱
Excellent heat resistance
- 低介電
Low dielectric
- 儲存安定性佳
Good storage stability
- 透明性佳
Excellent transparency
- 自身熱架橋性
Thermally cross-linkable
- 撓曲性佳
Excellent flexibility

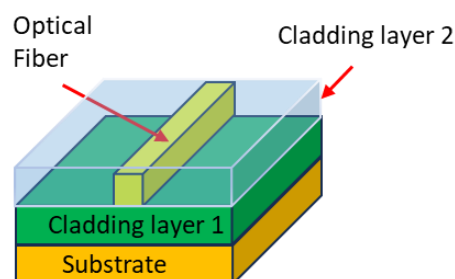
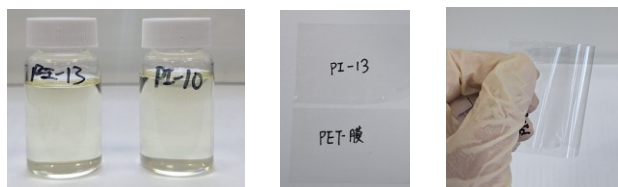
用 途

Applications

- CPO 包覆材
CPO cladding layer
- AR/VR 眼鏡
AR/VR glasses
- 軟性顯示器
Flexible display

製 品 寫 真

Product photography



特 性

Properties

Item	PI-13	PI-10	Note
Solid content%	35-40%	35-40%	Solvent : DMAC
Glass transition temp.	240°C	156°C	Dynamic Mechanical Analysis ; DMA
Td(5%)	500°C	466°C	Thermogravimetric analysis ; TGA
Dk(10GHz)	2.65	2.75	10GHz Cavity perturbation method
Df(10GHz)	0.0045	0.0024	10GHz Cavity perturbation method
b *	1.18	1.2	Nippon DENSHOKU Colormeter NE-4000
UV% (700nm)	88~89%	88~89%	UV visible
RI (25°C)	1.5460 ~1.6004	1.5420 ~1.5990	ABBE refractometer
Cross-cut test	X	5B	Substrate : glass

建議烘烤條件：230°CX60min

以上資訊為敝司的測試結果，建議使用者根據需要自行測試和驗證

The above information is the test results of our company, users are advised to test and verify according to their needs.

5G/6G 通信領域材料

超低介電反應型磷系難燃劑

5G/6G communication materials

Ultra-low Dielectric Phosphorus Flame Retardant

特長

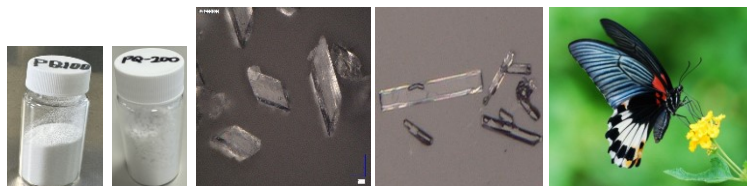
Features

- 超低介電損失
Ultra-Low dielectric loss
- 低介電常數
Low dielectric constant
- 高熔點
High melting point
- 競聚率 $r \approx 0$
Reactivity ratio $r \approx 0$
- 高磷含量
High phosphorus content

製品

Products

次世代難燃劑



PQ-100

PQ-200

特殊蝶形結構

用途

Applications

- PPO樹脂
PPO resin
- 碳氫樹脂
Hydrocarbon resin
- 電解質難燃樹劑
Flame retardant for electrolytes
- UV硬化樹脂
UV curing resin
- 光學材料
Optical materials

特性

Properties

Item	Unit	PQ-100	PQ-200
Phosphorus Content	wt %	14~15	13~14
Melting Point/DSC	°C	208	191
Refractive Index n^{20}		1.58	1.57
Particles Size D(50)	μm	<2	<2
Td3/TGA	°C	288	295
Td5/TGA	°C	302	306
Df (10GHz)		0.0003	0.0004
Water Content	%	≤ 0.5	≤ 0.5
DCM Solubility		◎	◎

DCM : Dichloromethane

應用例

Examples

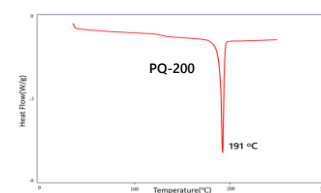
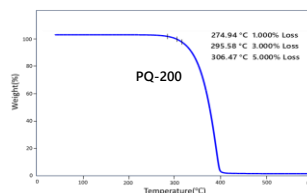
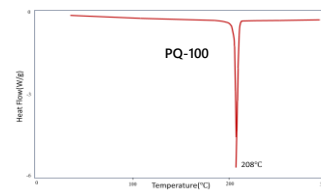
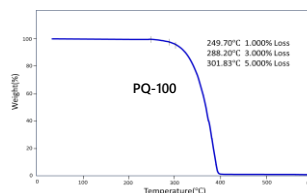
PP-V /Wt	PQ-100 /Wt	Tg (DSC) /°C	Td3 /°C	Td5 /°C	Dk (10GHz)	Df (10GHz)	UL-94
100	0	208	342	373	2.35	0.0041	V-1
90	10	211	343	376	2.33	0.0033	V-1
80	20	213	349	382	2.30	0.0025	V-0

PP-V /Wt	PQ-200 /Wt	Tg (DSC) /°C	Td3 /°C	Td5 /°C	Dk (10GHz)	Df (10GHz)	UL-94
100	0	208	342	373	2.35	0.0041	V-1
90	10	195	315	346	2.42	0.0034	V-1
80	20	183	300	320	2.44	0.0026	V-0

PP-V: PPO resin varnish

以上資訊為敝司的測試結果，建議使用者根據需要自行測試和驗證

The above information is the test results of our company, users are advised to test and verify according to their needs.



5G/6G 通信領域材料 添加型磷氮系難燃劑

5G/6G communication materials
Additive Phosphorus-Nitrogen Flame Retardant

開發品

特長

Features

- 難燃性 Flame retardancy
- 高磷含量 High phosphorus content
- 磷氮協同阻燃 P-N synergistic flame retardancy
- 低發煙 Low smoke
- 銅箔接著性佳 Excellent copper foil adhesion

用途

Applications

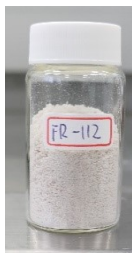
- PPO樹脂 PPO resin
- 環氧樹脂 Epoxy resin
- 複合材料 Composite materials

製品

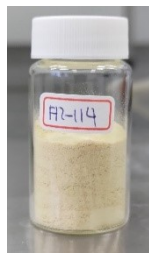
Photos



FR-110



FR-112



FR-114

特性

Properties

Item	FR-110	FR-112	FR-114
Phosphorus content	11-13%	11-13%	11-13%
Nitrogen content	5.1%	5.4%	5.5%
Melting Point	215°C	194°C	187°C
Td5	242°C	264°C	269°C
Appearance	白色固體	米色固體	黃色固體
Water content	<0.1%	<0.1%	<0.1%
Toluene solubility	△	○	△

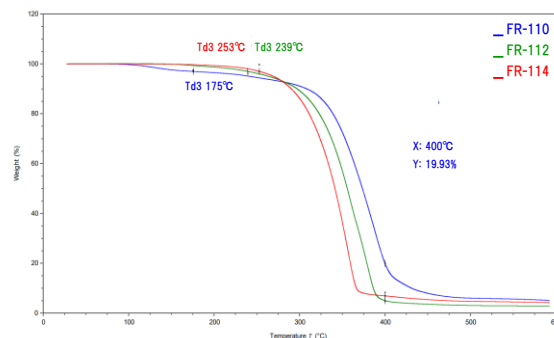
○ : Dissolving △ : sparingly soluble X : Insoluble

應用例

Examples

Item	Dk	Df	Tg(DMA)	UL-94
PPO-varnish	2.50	0.00613	198°C	V-1
PPO-PQ60	2.49	0.00390	186°C	V-0
PPO-FR-110	2.40	0.00366	193°C	V-0
PPO-FR-112	2.49	0.00457	180°C	V-0
PPO-FR-114	2.40	0.00460	178°C	V-0

※阻燃劑添加量為25phr



以上資訊為敝司的測試結果，建議使用者根據需要自行測試和驗證

The above information is the test results of our company, users are advised to test and verify according to their needs.