Gold Sun Technology Co.,Ltd.

Technical Data: PI-001-CL

Product Description

PI-001-CL series products provide colorless polyimide precursors (poly(amicacid) solution) dissolved in N-methyl- 2-pyrrolidone (NMP) based solvent.

Regarding to the design of molecular structures, these series of P-001-CL products have fully aromatic polyimide based on rigid and semi-rigid rod backbone chemistry.

PI-001-CL has medium molecular weights in a meta-stable state before postbake process and equal equivalent of diamines and dianhydrides ratio.

Therefore, the physical properties of cured film are even better than high molecular weight approach, and the processibilties of liquid are excellent.

PI-001-CL series products can also be applied by spin coating and other coating techniques. The rigid rod polyimide structure of cured PI-001-CL products exhibits a desirable combination of film properties such as low stress, low CTE, low moisture uptake rate, high modulus and good ductility for microelectronic applications.

PI-001-CL series products are suitable for colorless substrate and thick film applications. Especially for silicon, glass, silicon oxide, metal oxide, and silicon nitrile, and so on. They are suitable for Solar Cell and Display industries.

Process Details

PI-001-CL series products can becoated and patterned over a variety of substrates. The pretreatment with adhesion promoter should be conducted if adhesion is poor.

All the process should be adjusted by customer to fit the specific requirements.

1. Substrate Cleaning.

Prior to application the substrate should be free of particles and any surface contamination. Traditional wet and dry cleaning techniques can be used to accomplish this.

2. Dehydration Bake:

100~200°C/ 30 minutes for oven.

150±25°C/5~10 minutes for hot plate.

3. Coating

General guidelines for dispensing materials of this type:

• For best results, coating should be done in a cleanroom environment, with the relative humidity level should be

controlled between 50~60%RH.

• Always coat substrates which are at room temperature.

•Dispensing should be done in the center and as close to the substrate as possible.

• Never trap air into the solution.

• Take time to allow any bubbles to dissipate out of solution; if left in, comet-like coating defects could result.

• A clean-off at dispense is necessary before the spinning.

•Allow a short delay prior to spin for the polyimide to flow as far as possible
and relax.

4. Soft-Bake: 70~100 °C/30~5 min.
5. Post-Bake:

Temperature	Temp/Time
Ramp to 170 °C	2~5° C/min
170 °C	1 hour
170° C to 300 °C	2~5° C/min
300° C	1 hour
Ramp to 30 °C	-10° C/min

Note:

1. The rate of cooling must be lower than 10 °C/min.

2. Oxygen free (Nitrogen Purged) oven is recommended. ([O2] less than 100 ppm)

Storage/Shelf life

PI-001-CL is stable at clean-room temperature (23±2°C) and relative humidity (55±5 %RH) for four weeks with no significant change in properties.

When stored at -18°C, shelf-life is two years from date of manufacture. Moisture contamination is detrimental to stability and must be avoided. Containers should be brought to room temperature before opening to avoid moisture condensation inside the bottle.

Safety and Handling

During handling of PI-001-CL series products adequate ventilation must be provided. Skin and eye contact should be avoided. Exposed areas should be flushed with water immediately. For prolonged or repeated contact, milled butyl rubber or natural rubber gloves should be used.

Latex rubber gloves may be used for short term exposure risk. Disposable PVC gloves are not recommended. For further information, please consult the product MSDS sheets.

able 1 Liquid properties of PI-001-CL (Solution)

Item	Condition	Unit	Test Method	P-001-CL
Viscosity		cP	Brookfield	5,000± 500 (1)
Solid Content		%	250 °C/ 1hr	15±1
Impurities	Na	ppm	IPC-MS	< 1
	K	ppm	IPC-MS	<1
	Mg	ppm	IPC-MS	<1
	Ca	ppm	IPC-MS	<1
	Cu	ppm	IPC-MS	<1
	Fe	ppm	IPC-MS	<1
	Cr	ppm	IPC-MS	<1
	Mn	ppm	IPC-MS	<1

(1). The viscosity of P-001-CL can be adjusted to request.

Table 2 Physical properties of PI-001-CL (Cured Film)

Item	Condition	Unit	P-001-CL-LG01
Dielectric Constant	C-24/23/50	@ 1kHz	< 3.4
Dissipation Factor	C-24/23/50	@ 1kHz	< 0.005
Volume Resistance	C-96/23/65	W-cm	>1.0 $*10^{16}$
Surface Insulation Resistance	C-96/23/65	W	>1.0* 10^{15}
Moisture absorption	D-24/23	%	≦ 1 %
Thermal Decomposition Temperature (T_d)	TGA, 5 %	°C	> 550
Glass Transition Temperature (Tg)	TMA	°C	> 300
CTE	20 °C ~ 200° C	ppm/ °C	8±1
Tensile Strength	RT	MPa	≧ 100
Tensile Modulus	RT	GPa	≧ 2
Elongation	RT	%	≧ 10
Optical Property	b* (@10um)	-	≦ 2.2
Transmittance	400 nm (@10um)單一波長	%	> 65