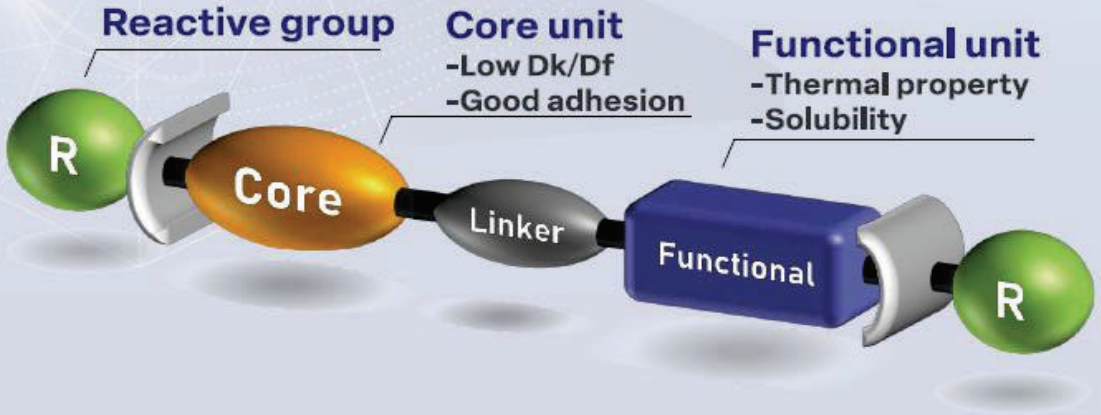
JSR ELPAC™ HC-G series

Low Dk/Df STPE (Self-crosslinking Thermosetting PolyEther)

Design Concept

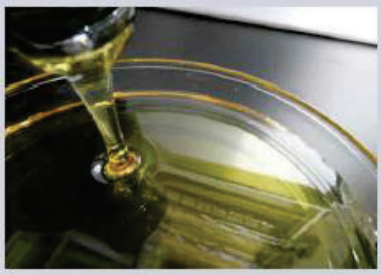
-Good balance between Dk/Df and other properties such as adhesion, thermal property, and solubility



Products list

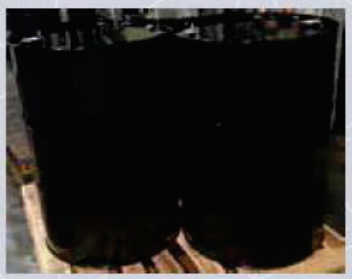
Products	HC-G0037	HC-G0024	HC-G0030	HC-G0038
Core + Functional	A	B	C	D
R	Radical-curable			
Non-volatile (%)	62	62	40	50
Viscosity (mPa・s)	500-1,500	1,500-2,500	15-20	50-150
Solvent	Toluene			

Appearance



Product container

20L Pail



200L Drum

(with HDPE liner)

Feb. 2025

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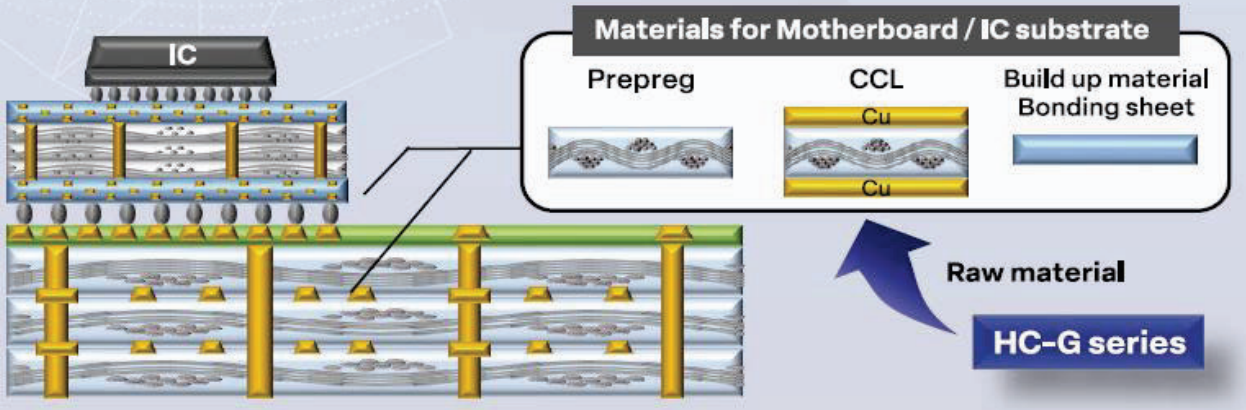
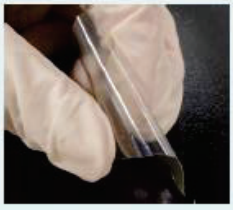
Application

-Expected to be useful as a raw material for circuit board

- ✓ High speed communication for Data Center/AI
- ✓ High Frequency for Antenna, Radar, Sensor and etc.
- ✓ Low Dk/Df IC substrate



Evaluation examples as cured film

	HC-G0037	HC-G0024	HC-G0030	HC-G0038
Feature	Low Df Good adhesion	Low Df High Tg	Low Df Good adhesion	Low Df High Tg
Dk (10GHz)	2.6	2.6	2.6	2.6
Df (10GHz)	0.0011	0.0009	0.0011	0.0014
Tg (°C , DMA)	172	233	176	184
T_d^5(°C)	390	399	396	395
Peel strength with Cu (N/mm)	0.8	0.6	0.8	0.7
Appearance			-	-

Composition: HC-G polymer / Organic peroxide. Cured at 200 °C

Feb. 2025

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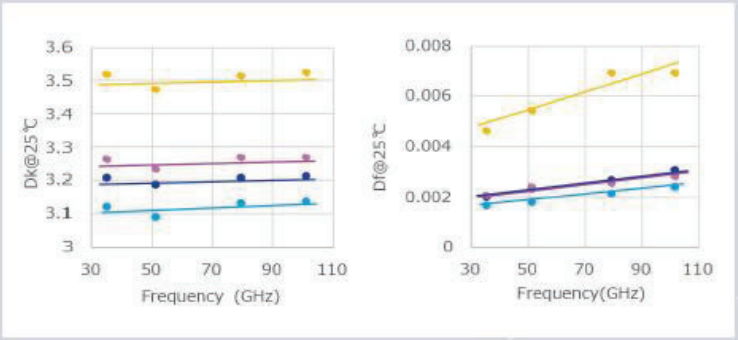
Evaluation examples as CCL

	HC-G0037 CCL	HC-G0024 CCL
Dk (10GHz)	3.2	2.8
Df (10GHz)	0.0013	0.0010
Tg (DMA)	183 °C	197 °C
Peel strength[1)]	0.9 N/mm	0.5 N/mm
Solder test @300℃	>300 sec	>300 sec

Composition: HC-G0037/PPE/Silica/SEBS/Flame retardants/Organic peroxide
Composition: HC-G0024/Silica/LDM-03/SEBS/Flame retardants/Organic peroxide
1) H-VLP3 Copper foil : Rz=0.5 μm

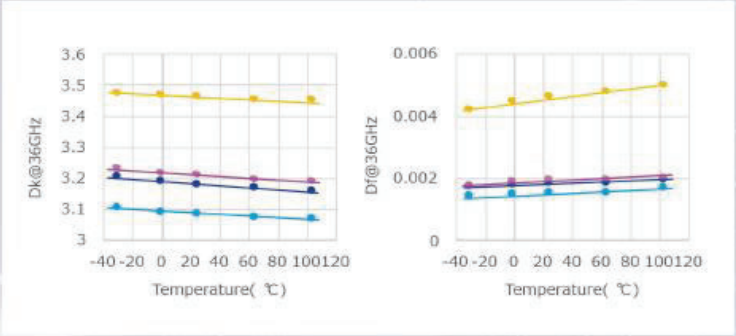
Frequency dependence of Dk/Df



HC-G0037 CCL
HC-G0024 CCL

Commercially available CCL-1
Commercially available CCL-2

Temperature dependence of Dk/Df



HC-G0037 CCL
HC-G0024 CCL

Commercially available CCL-1
Commercially available CCL-2

Feb. 2025

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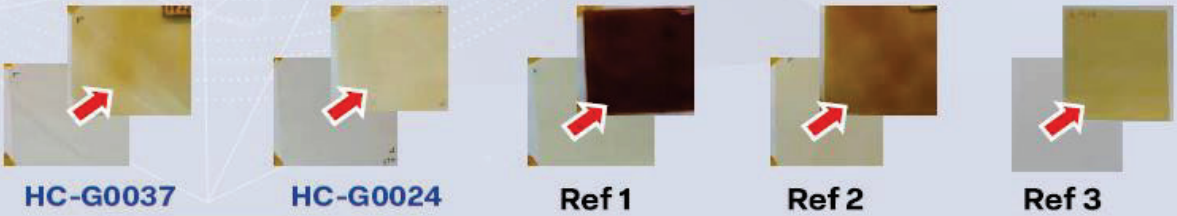
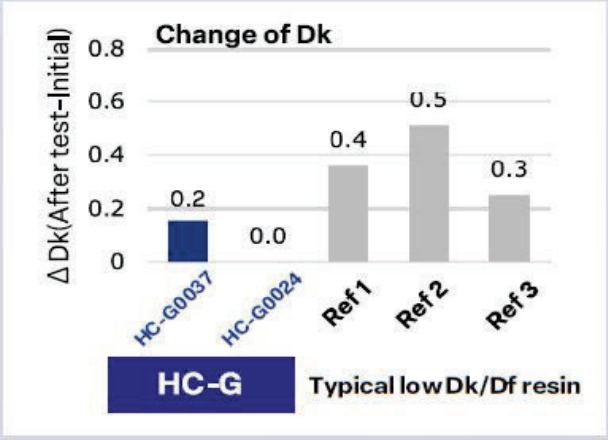
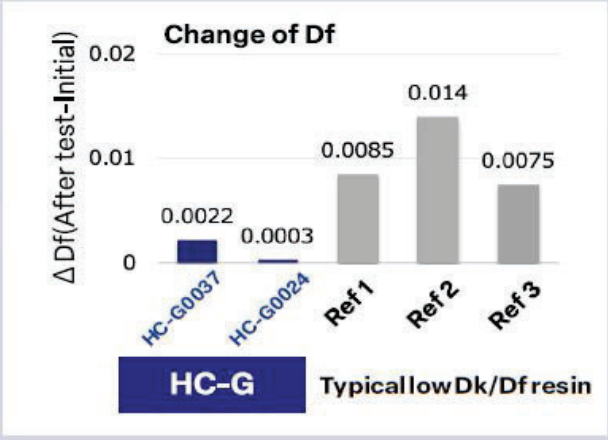
Evaluation examples of reliability

1. Heat resistance of cured film

Condition: 150℃ x 500h under air
Change of appearance

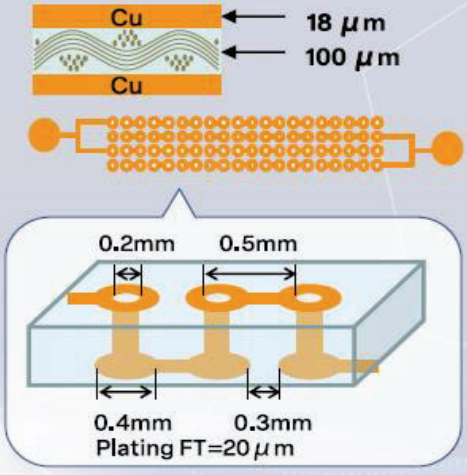


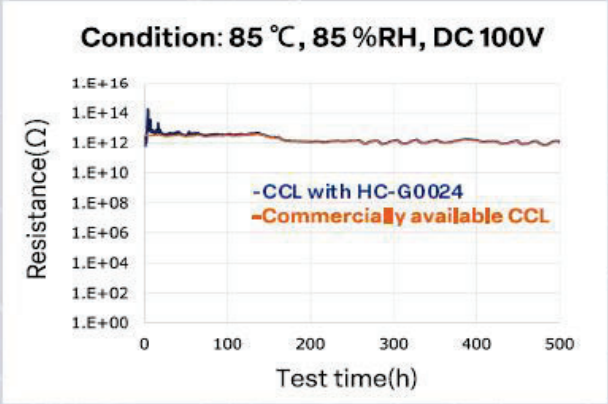




Composition: HC-G polymer / Organic peroxide. Cured at 200℃

2. Reliability of CCL with HC-G polymer





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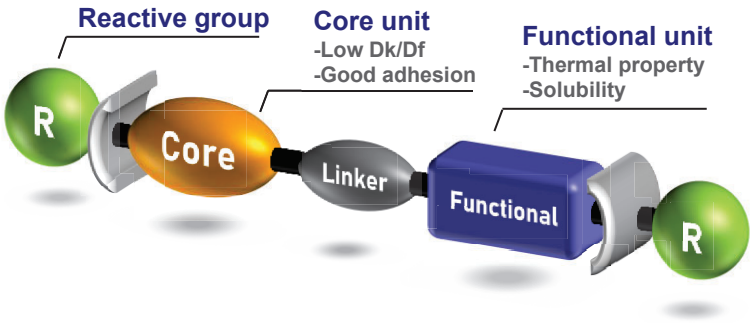
Higher molecular weight type

Design Concept



		HC-G0043	HC-G0044
Feature		Ultra low Df Good adhesion	Ultra low Df Excellent adhesion
Structure	Core + Functional	B′	B″
	R	Radical-curable	Radical-curable
	Molecular weight	Middle	High
Product	Non-volatile (%)	45-55	40-50
	Solvent(%)	Toluene 55-45	Toluene 60-50
	Viscosity(mPa s @25°C)	500-9,000	600-9,000
Properties Composition Initiator 0.5phr	Dk/Df @10GHz	**2.6/0.0008**	**2.6/0.0008**
	Tg (℃, DMA)	**216**	**224**
	T_d^5 (℃)	**420**	**428**
	Peel strength (N/mm)	**0.7**	**1.0**

Curing Condition: 200℃ x 2h, under N_2.