

TECHNICAL DATA SHEET

LS-2211

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A. MATERIAL DESCRIPTION

EFIRON[®] LS-2211 is Secondary coating for Glass Optical fiber. EFIRON[®] LS-2211 has suitable glass transition temperature, anti-scratch, abrasion resistance, rapid cure property, free-point lump, water and chemical resistance, low volatilization, high oxidative and hydrolytic (moisture) stability which are required by optical fiber industry application.

1. CURING CONDITION

EFIRON[®] LS-2211 has fast cure speed so it can be applied to 2,000 m/min line. The minimum UV dose for complete cure is about 0.2~0.3 J/cm² (UV-A range) under the nitrogen environment.

2. STORAGE

EFIRON[®] LS-2211 can be polymerized under improper storage conditions. Store materials away from direct sunlight and presence of oxidizing agents and free radicals. Storage temperature range is between 10°C to 30°C.

3. Shelf Life

EFIRON[®] LS-2211 has a recommended shelf life of 12 months from the date of manufacture, provided that the above stated storage conditions are properly maintained.

4. Precaution

EFIRON[®] LS-2211 can cause skin and eye irritation after contact. Therefore, avoid direct contact with these materials. If contact occurs, immediately rinse affected areas copiously with water.

5. NOTES

The information contained herein is believed to be reliable but is not to be taken as representation, warranty or guarantee and customers are urged to make their own tests.

B. MATERIAL PROPERTIES

1. Liquid Coating

Haziness Value	at 23 °C	0.46%
Viscosity	at 25 °C	4500 cPs
	at 35 °C	1900 cPs
Density	at 23 °C	1.12 g·cm ⁻³
Refractive Index	at 25°C	1.5115
Gel Flow Time	at 23 °C	37 sec
Surface Tension	at 25°C	23 dynes·cm ⁻¹
Crystallization Temperature	at -60~80 °C	Not Detect

2. Cured Coating

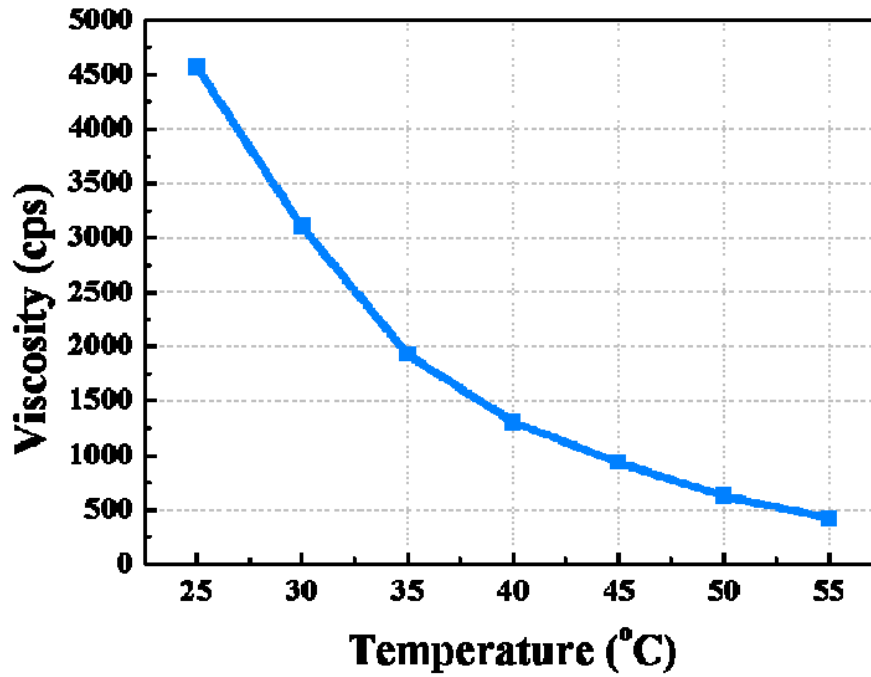
<u>Test at <1% R.H</u>		
Glass Transition Temperature		
at Tan_delta Max		58 °C
Elastic Modulus at 23 °C		1070 MPa
at 85 °C		29 MPa
at 100 °C		23 MPa
<u>Test at 23°C, 50% R.H</u>		
95% Cure Energy		0.22 J·cm ⁻²
Secant Modulus at 2.5% Strain		850 MPa
Tensile Strength		30 MPa
Elongation		10 %
Refractive Index at 633nm		1.5308
at 852nm		1.5247
at 1550nm		1.5188
Thermal Weight Change		
150 °C		1.67 %
300 °C		7.06%

* Cured condition : D-bulb, 1J/cm²(UV-A Range : 315-400nm)

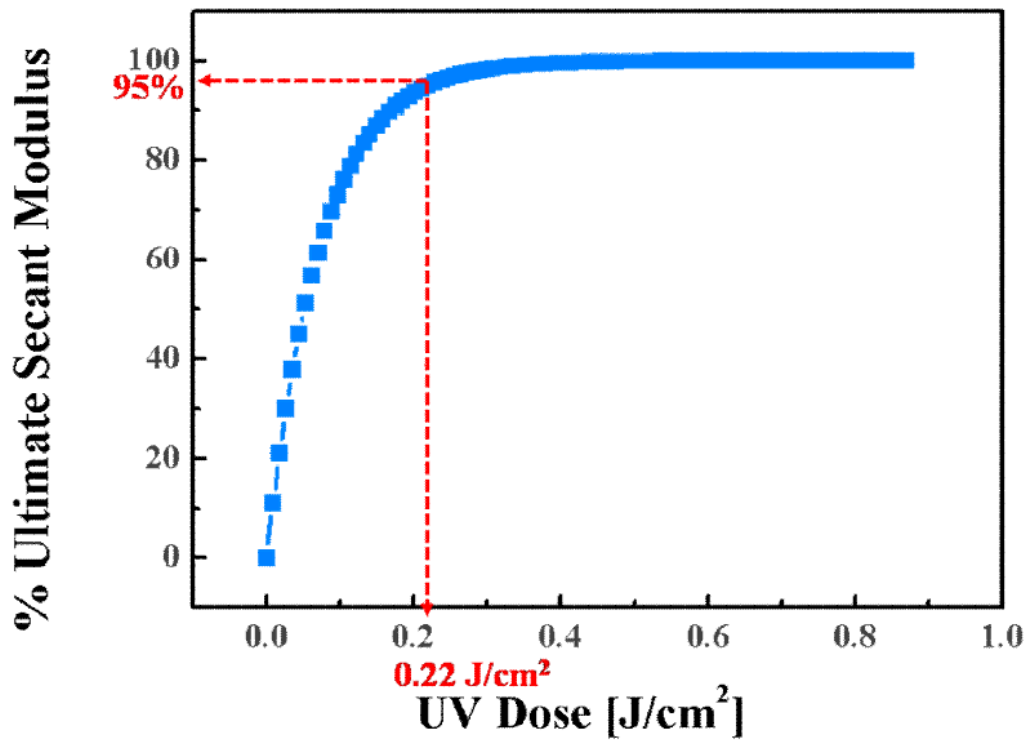
* Film preparation : 75 μm thickness film conditioned for 24hrs in 23 °C/50% R.H

C. GRAPH & TABLE RELATED DATA

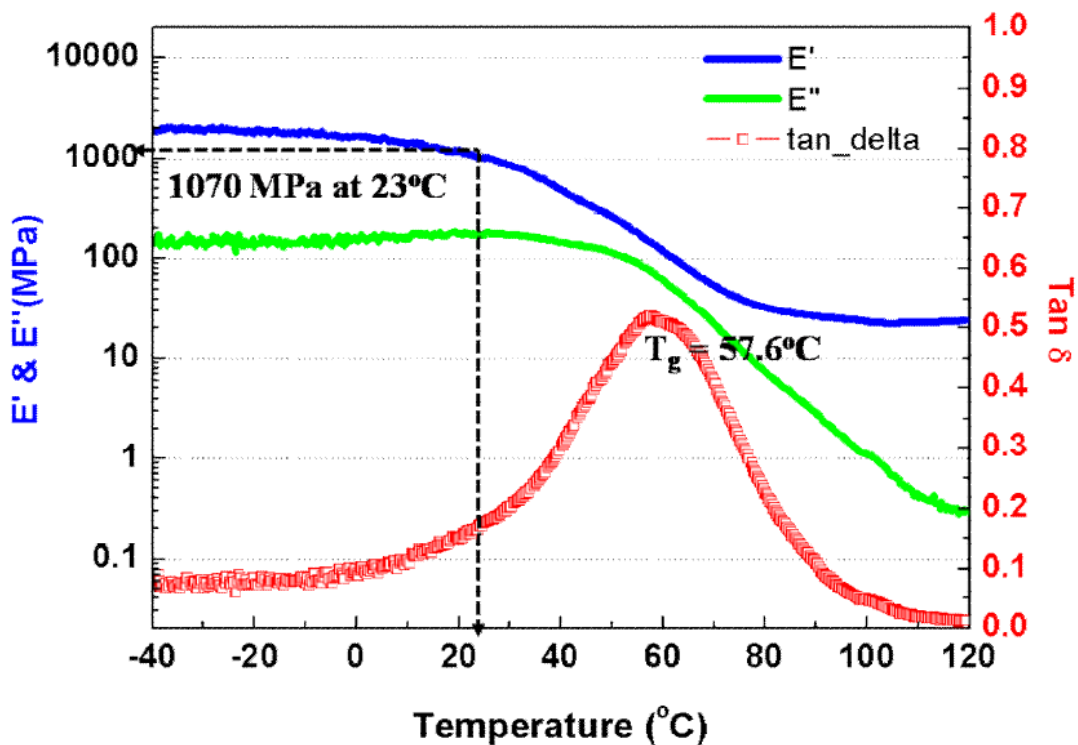
1. VISCOSITY PROFILE



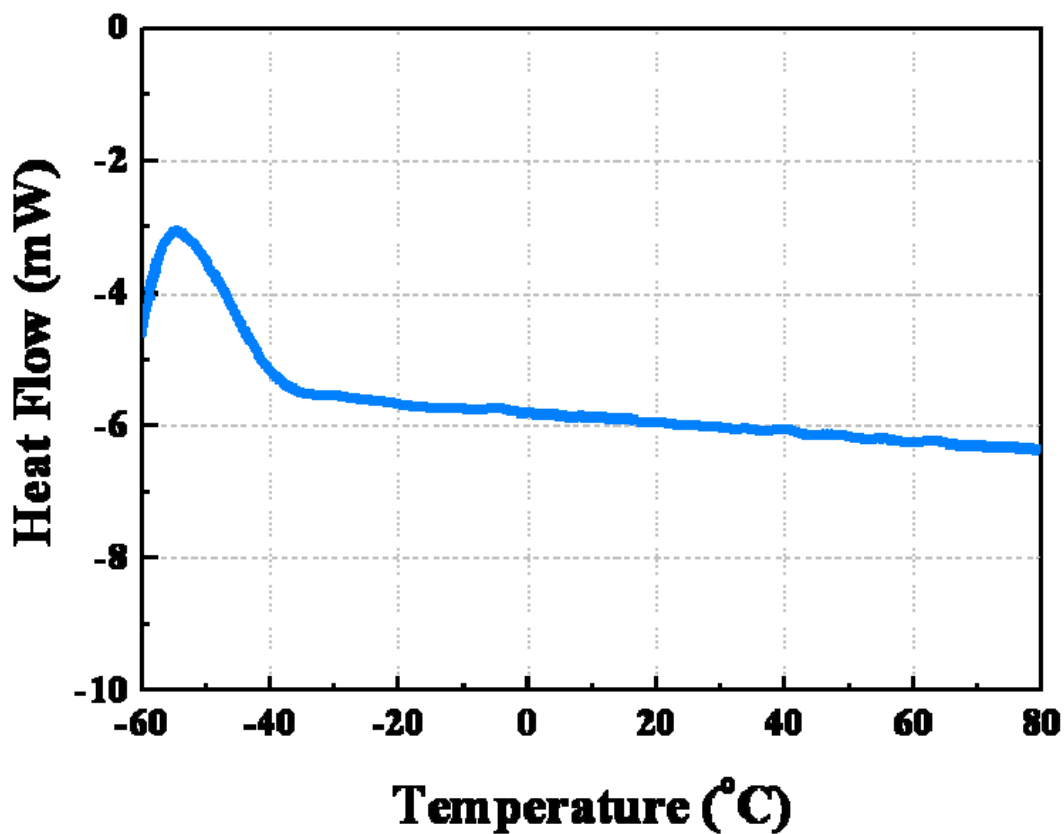
2. Cure Energy



3. DMTA Analysis



4. DSC Analysis



D. APPENDIX

1. TEST EQUIPMENT & Method

	Equipment	Method
Hazeness Value (%)	Haze-Guad + Hazemeter	-
Viscosity (cPs)	Brookfield DV III+	ASTM D-1084 Method B
Refractive Index	Abbe refractometer (Liquid) Prism Coupler (Cured)	ASTM D 542 – 50
Density (g/cm ³)	Pycometer	ASTM 1475
Surface Tension (dynes/cm)	KRÜSS K100 Tensiometer	ASTM D-1331-56
Gel Flow Time (sec)	0.45um PVDF Syringe Filter	-
Crystallization Temperature(°C)	DSC	-
2.5% Secant Modulus (MPa)	Instron 5543 UTM	ASTM D-638
Elongation (%)	Instron 5543 UTM	ASTM D-638
Tensile Strength (MPa)	Instron 5543 UTM	ASTM D-638
Tg (°C)	DMTA	-
Elastic Modulus (MPa)	DMTA	-
Thermal Weight Change (%)	TGA	-

2. Unit Conversion

$$N = \text{kg}_f \times 0.102$$

$$\text{cPs} = \text{mPa} \cdot \text{s}$$

$$\text{MPa} = \text{kg}_f/\text{mm}^2 \times 9.8$$