

ZEONREX Electronic Chemicals

High Performance Insulator

ZWD6216

ZEON CORPORATION *Specialty Materials Division*

○ Headquarters

1-6-2 , Marunouchi , Chiyoda-Ku , Tokyo 100-8246

+81 - 3 - 3216 - 0590 (TEL)

+81 - 3 - 3216 - 1827 (FAX)

<http://www.zeon.co.jp/>

< U.S.A >

Zeon Chemicals L.P. (ZCLP)

4111 Bells Lane, Louisville, Kentucky 40211

(TEL) +1-502-775-2040

(FAX) +1-502-775-2025

<http://www.zeonchemicals.com/>

**Any process conditions and data are examples.
Those will not guarantee the same data in customers' process.**

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1. Characteristics
2. Outgas Data (TDS)
- 3. Insulation Performance (ϵ , water absorption)**
4. Resistance for solvents
5. Resistance for Plasma treatment
6. Application for OLED (Generation of Dark Area)

1. Characteristics

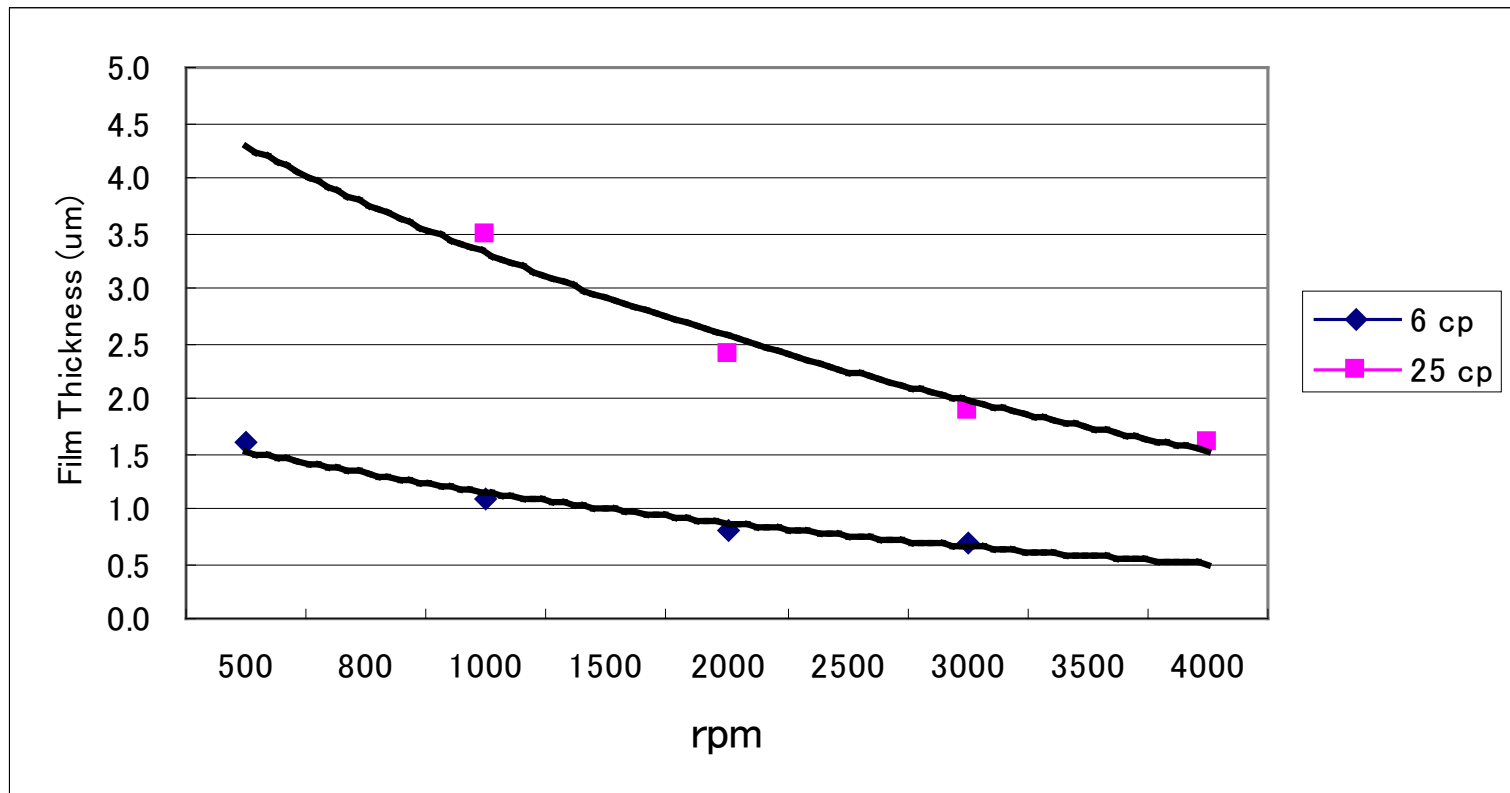
ZWD6216 is high performance photosensitive (positive type) insulator .

- (1) Easy process (Same as normal photoresist)**
- (2) Generate very few outgas , water absorption , and shows very good device reliability**

(For example , Organic EL device)
- (3) Shows high resistivity against plasma**

1-2. Spin Curve

- **ZWD6216 - 6 : Standard Type (target thickness 1 μm)**
- **ZWD6216 - 25 : Under Development (target thickness 3 μm)**

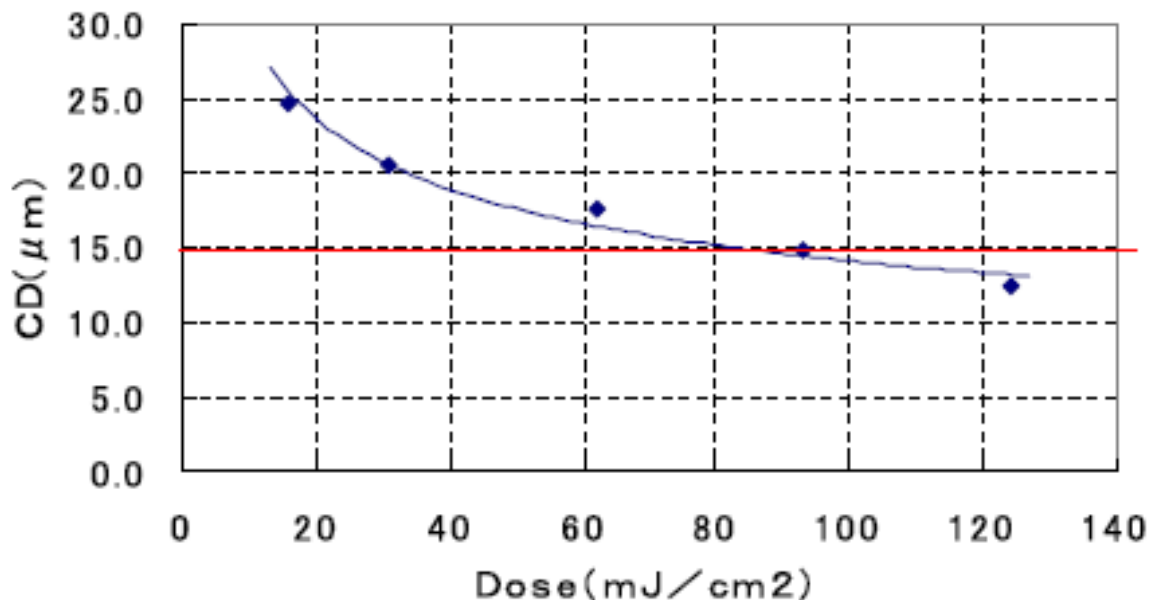


1-3. Example of Process Condition

- **Coating (Spin , Slit Coating etc.)**
- **Soft Bake (100 - 110 °C * 90 - 110 sec.)**
- **Exposure**
- **Development : 2.38 % TMAH , Puddle 60 - 70 sec.**
- **Rinse : DI , Air Dry**
- **Hard Bake : 200 °C - 230 °C * 30 - 60 min. (Oven)
2 - 3 min. (Hot Plate)**

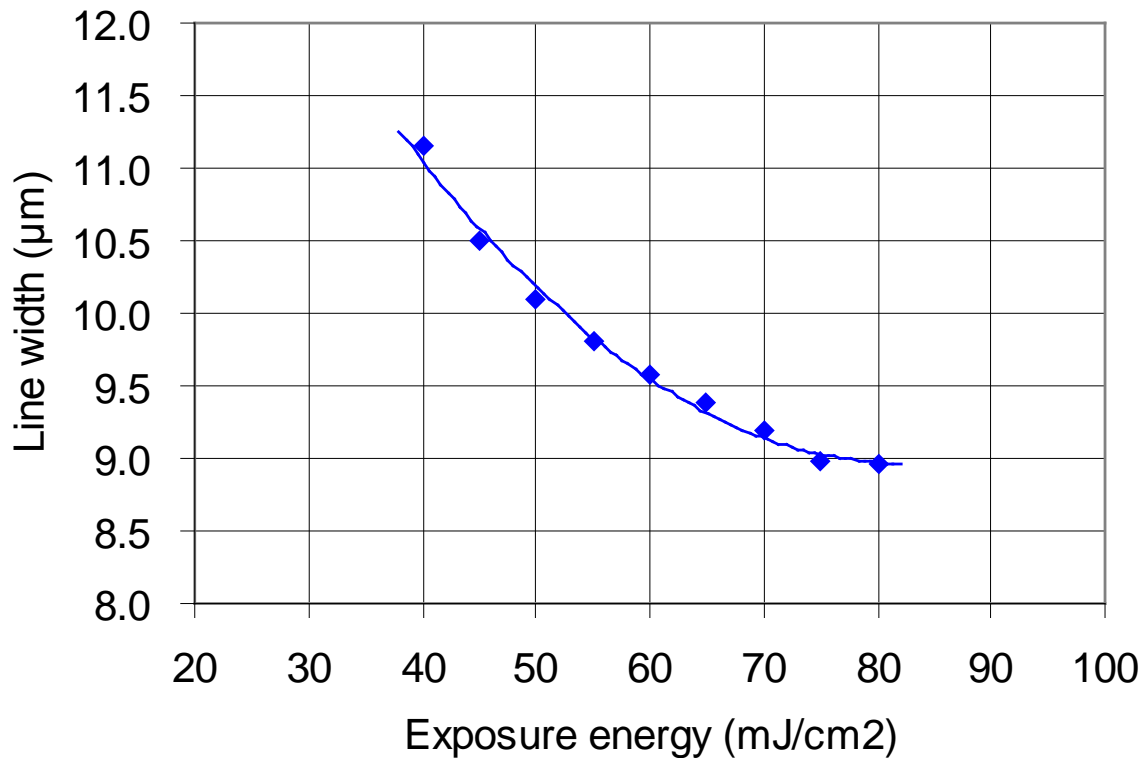
1-4. Exposure margin (Film Thickness , 1.0 μm)

< Exposure Latitude Mask 15 μm >



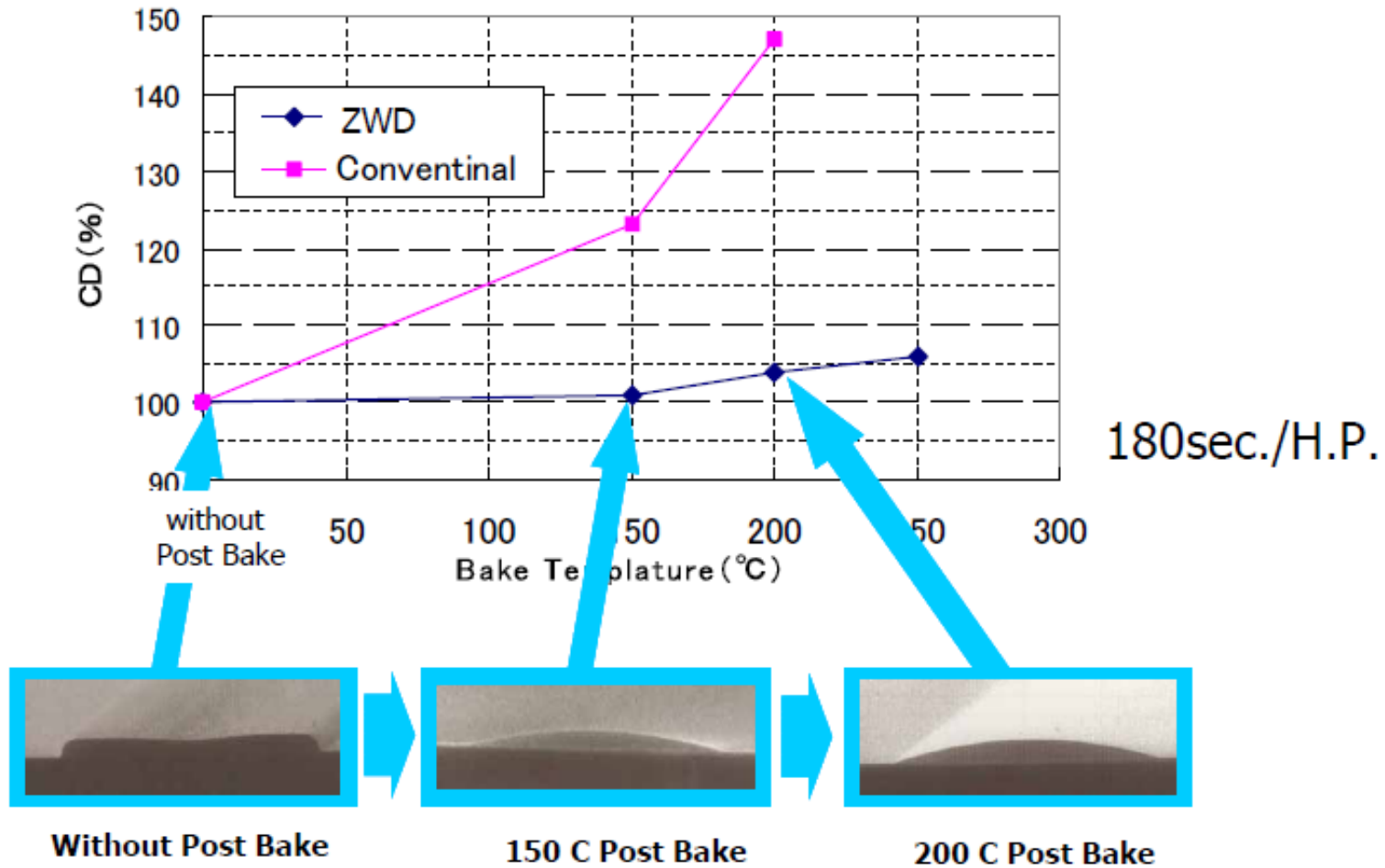
Process Conditions
 Pre Bake : 100deg.Cx90sec.
 Film Thickness : 1.0 μm
 Exposure : PLA501F(Canon)
 Dev. : 2.38% TMAHO, 60sec.
 Post Bake Temp. : 200deg.Cx120sec.
 Mask Size : 15 μm

1-4. Exposure margin (Film Thickness , 2.5 μm)



Pre Bake : 110 $^{\circ}\text{C}$ * 110 Sec.
Film Thickness : 2.5 μm
Exposure : G-Line Stepper
 (NA = 0.54)
Development : 2.38 % TMAH
 70 sec. Puddle

1-5. CD stability after Post Baking



2-1. Outgas of ZWD6216 (TDS analysis condition)

Instrument: WA1000S/W(Denshi-Kagaku)

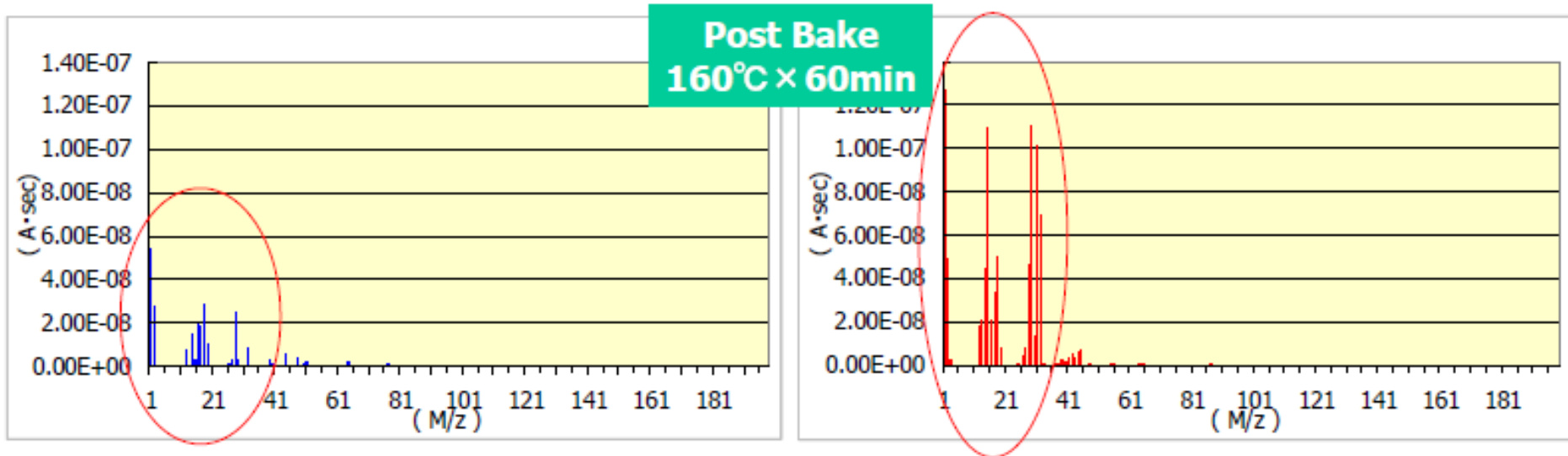
<Method A>

Heating rate: 60°C/min

Holding Temp.: 230°C × 60min

Measurement Mode: Scan , M/z=1 ~ 200

2-2. Outgas of ZWD6216 (Hard Bake 160 °C * 60 min Oven , F. T. 1.2 μm)

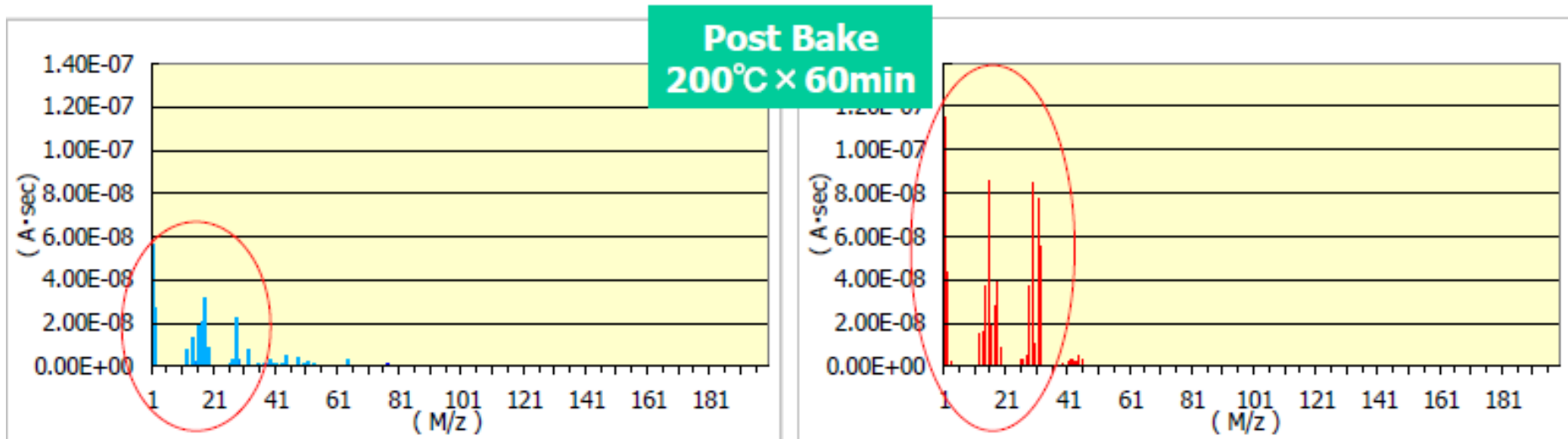


**Less outgas compared with Competitor
under condition of low temperature hard bake .**

2-2. Outgas of ZWD6216 (Hard Bake 200 °C * 60 min Oven , F. T. 1.2 μm)

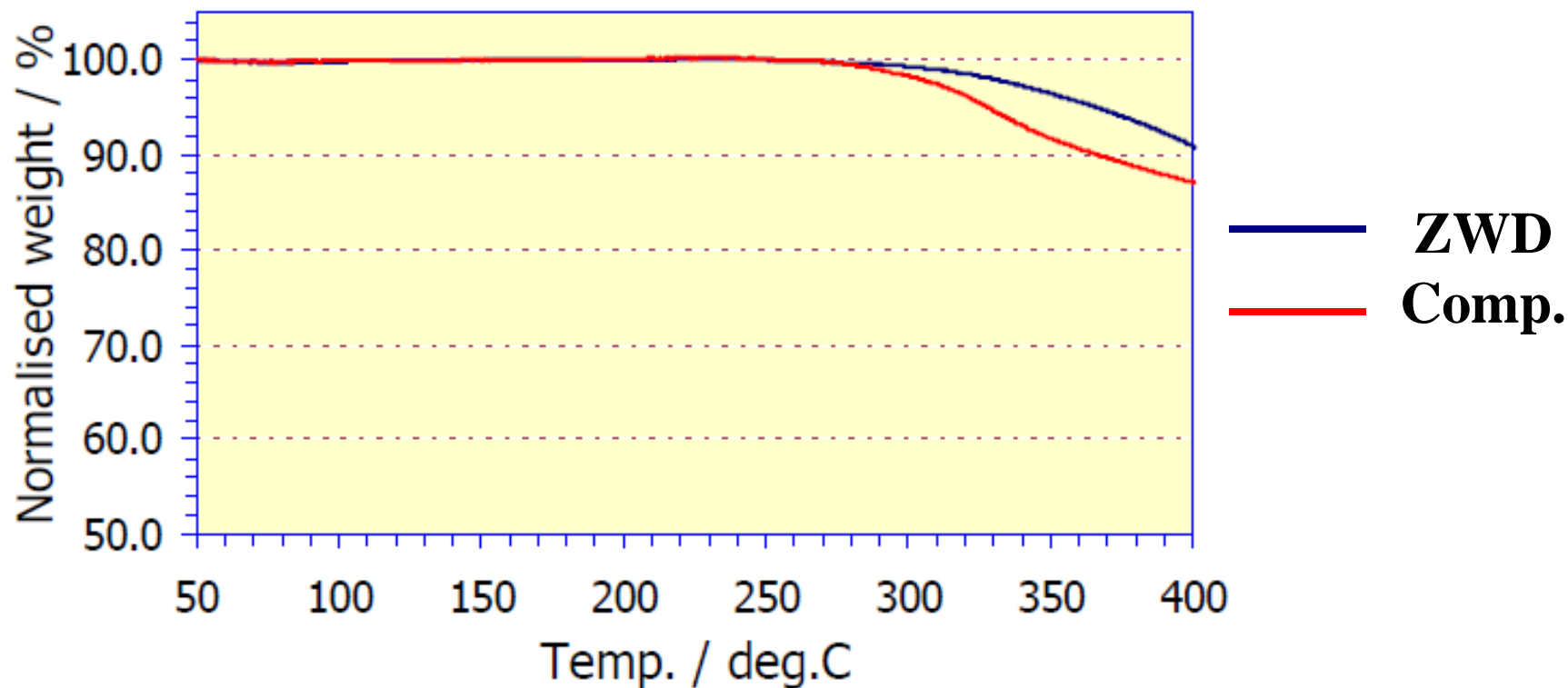
ZWD6216

Competitor



Less outgas compared with Competitor .

2-3. Thermal degradation of ZWD6216

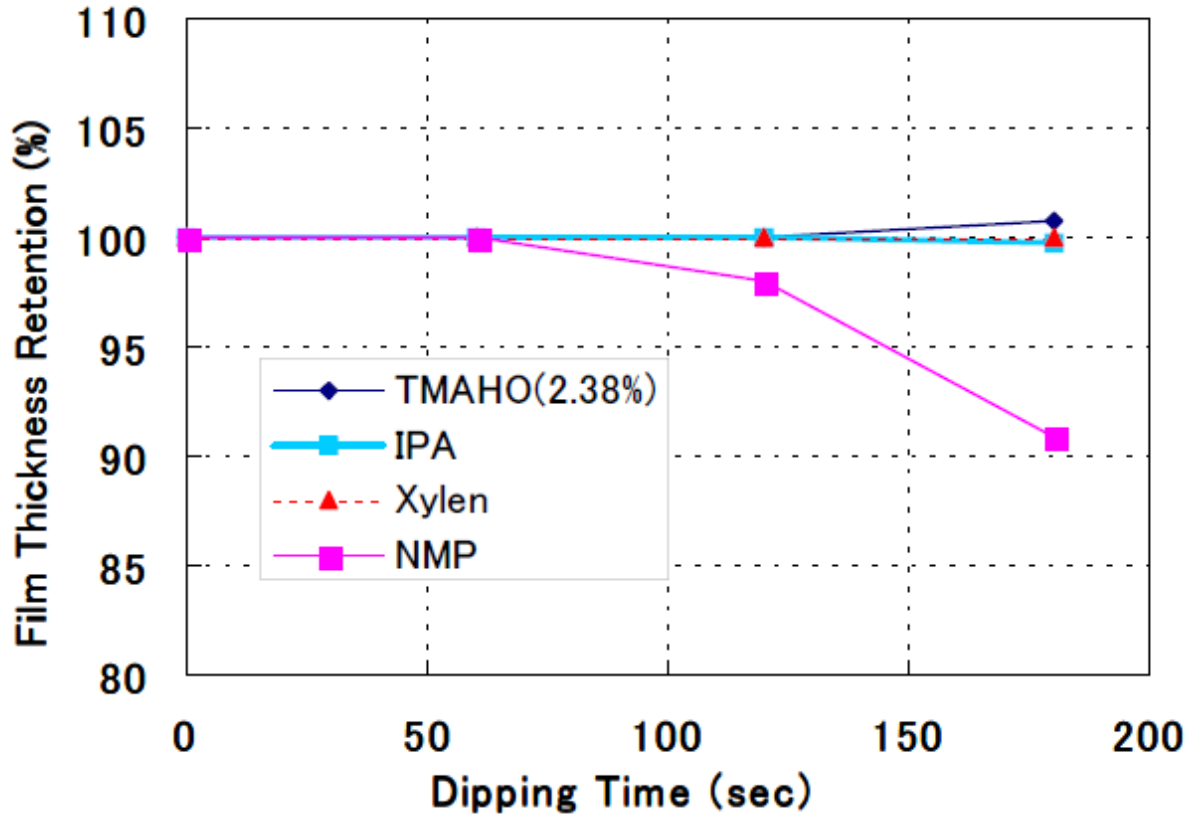


ZWD6216 shows high thermal stability .

3. Insulation performance of ZWD6216

	Dielectronic constant (ϵ , 1 MHz)	surface resistance (Ω)	volume resistance (Ω m)	Water absorption (%)	Water permeability (g/m ² /day)
ZWD6216	3.44	4.50 E+16	3.00 E+16	0.22	195
Comp.	3.48	2.30 E+16	7.60 E+16	0.65	1450

4. Resistance for solvents



Without exposure
 Hard Bake
 200 °C * 2 min. (H.P.)

Very few film loss after post baking by dipping various solvent

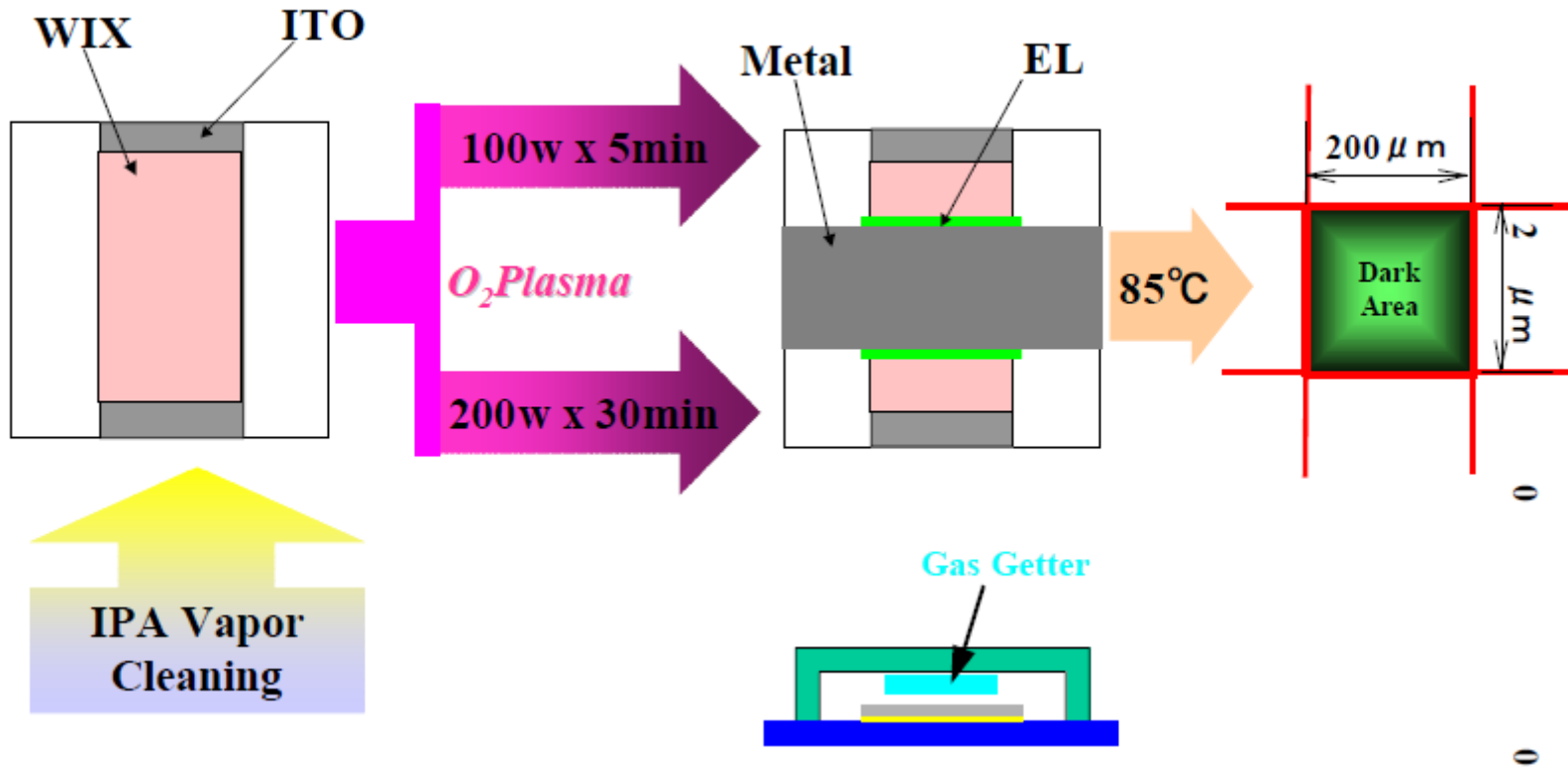
5. Resistance for plasma treatment

	Film Loss by O ₂ Plasma (um)	Film Loss by O ₂ +CF ₄ plasma (um)	Contact angle against H ₂ O (without plasma treatment)	Contact angle against H ₂ O (After CF ₄ plasma treatment)	Relative Out Gas level
ZWD6216	0.06	0.14	28	88	1
Comp. A	0.21	0.27	35	79	1.7
Comp. B	0.14	0.27	27	86	3.6

- Shows very high resistance against plasma**
- Contact angle will increase by CF₄ / O₂ plasma treatment.**
- Shows very few outgas at customer's evaluation.**

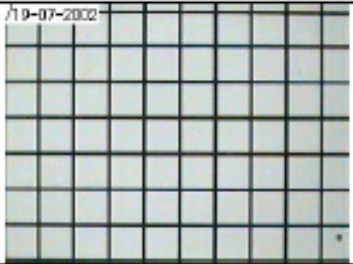
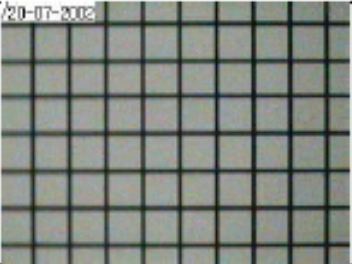
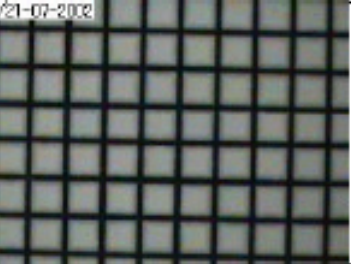

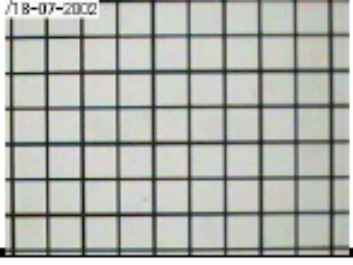
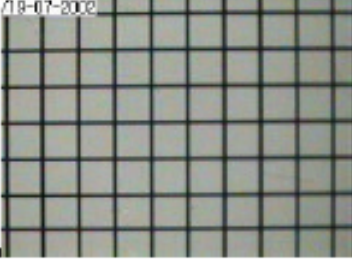
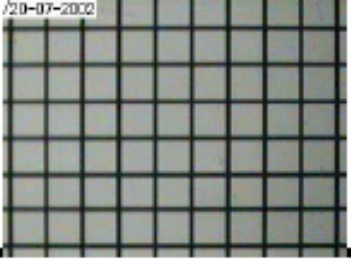
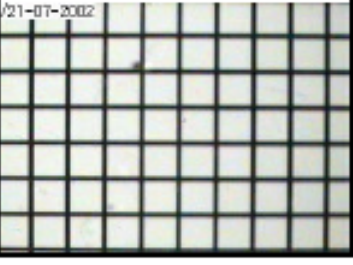
Film Thickness 1.8 μm
 Post Bake
 200 °C * 2 min (Hot Plate)
 Some customer's data

5-1. Application for OLED (Device Reliability) (Structure of test display)



ZWD Patterning → IPA Vapor → O_2 Plasma → Low MW. Type EL, Metal
Strage test under 85°C → Dark Area Measurement

5-2. Application for OLED (Device Reliability)

	Initial	24hr	48hr	72hr
Comp.				
ZWD6216				

**O₂/Ar=50/50 200wx30min
85°C Strage**

ZWD6216 shows very high reliability for OLED