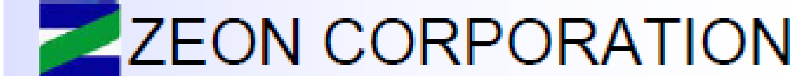

ZEONREX Electronic Chemicals

High Performance Insulator

ZWD6216

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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
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1. Characteristics

ZWD6216 is high performance photosensitive (positive type) insulator .

(1) Easy process (Same as normal photoresist)

(2) Ganerate very few outgas , water absorption , and shows very good devise relaiability

(For example , Organic EL devise)

(3) Shows high resisitanse against plasma

1-2. Spin Curve

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

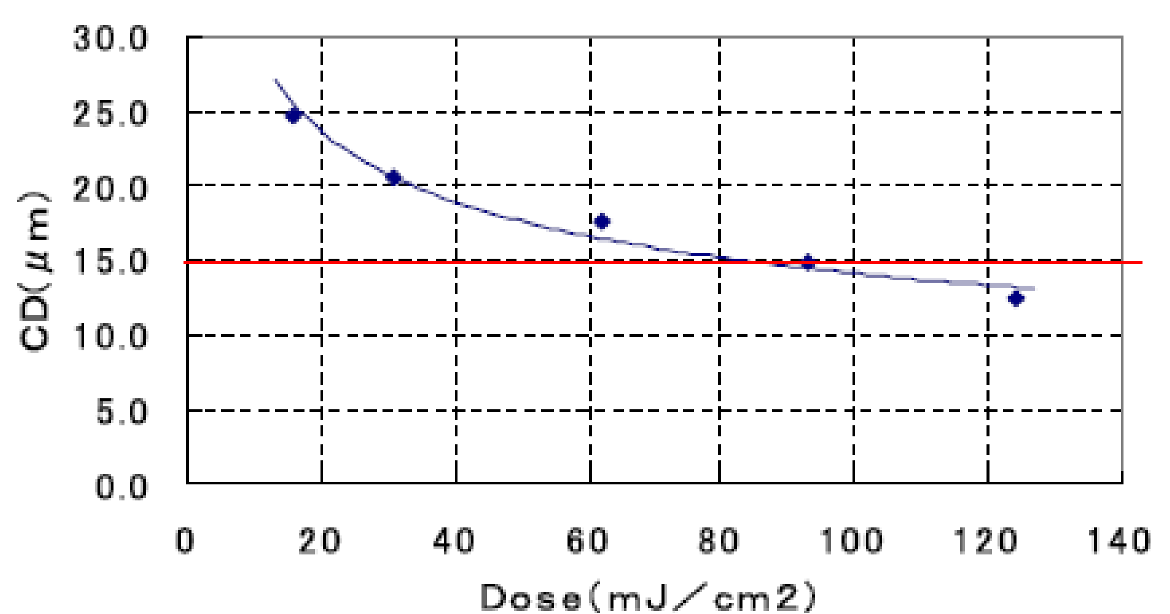
Film Thickness (um)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
500
800
1000
1500
2000
2500
3000
3500
4000
rpm
6 cp
25 cp

1-3. Example of Process Condition

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

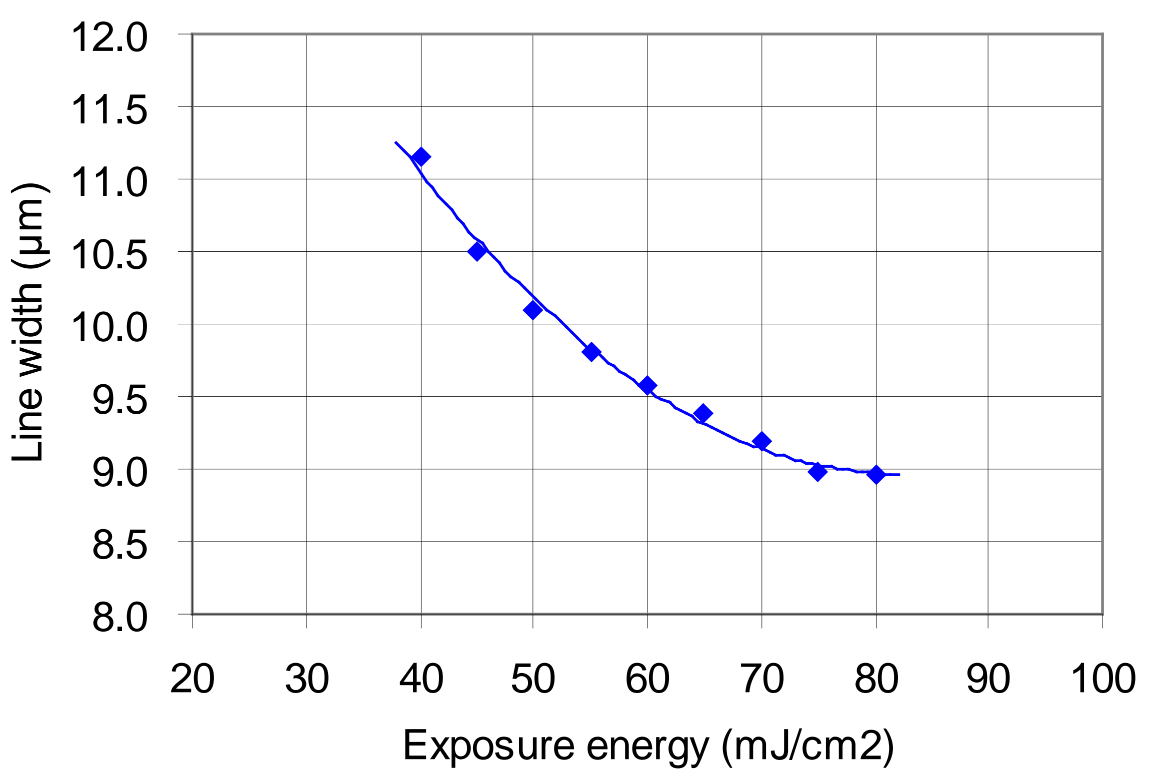
1-4. Exposure margin (Film Thicness , 1.0 μm)

< 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 Thicness , 2.5 μm)



Pre Bake : 110 ℃ * 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

CD (%)

150
140
130
120
110
100
90

ZWD
Conventinal

without Post Bake
50
100
50
200
50
300

Bake Te plature (℃)

180sec./H.P.

Without Post Bake

150 C Post Bake

200 C Post Bake

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

Instrument: WA1000S/W(Denshi-Kagaku)

<Method A>

Heating rate: 60℃/min

Holding Temp.: 230℃ × 60min

Measurement Mode: Scan , M/z=1～200

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

Post Bake
160℃×60min

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

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

ZWD6216

Competitor

Post Bake 200℃×60min

Less outgas compared with Competitor .

2-3. Thermal degradation of ZWD6216

Normalised weight / %

100.0
90.0
80.0
70.0
60.0
50.0

50 100 150 200 250 300 350 400

Temp. / deg.C

ZWD
Comp.

ZWD6216 shows high thermal stability .

3. Insulation performance of ZWD6216

	Dielectronic constant (ε , 1 MHz)	surface resistance (Ω)	volume resistance (Ωm)	Water absorpition (%)	Water permeability (g/m2/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

Film Thickness Retention (%)

110
105
100
95
90
85
80

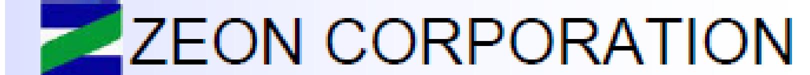
0 50 100 150 200

Dipping Time (sec)

TMAHO(2.38%)
IPA
Xylen
NMP

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

Very few film loss after post baking by dipping verious solvent



5. Resistance for plasma treatment

	Film Loss by O2 Plasma (um)	Film Loss by O2+CF4 plasma (um)	Contact angle against H2O (without plasma tretment)	Contact angle against H2O (After CF4 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

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

Film Thickness 1.8 µm

Post Bake
200 ℃ * 2 min (Hot Plate)

Some customer's data

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

ZWD Patterning → IPA Vapor → O2 Plasma→ Low MW. Type EL , Metal Strage test under 85 ℃ → Dark Area Mesurement

5-2. Application for OLED (Deveice Reliability)

	Initial	24hr	48hr	72hr
Comp.	19-07-2002	20-07-2002	21-07-2002	22-07-2002
ZWD6216	18-07-2002	19-07-2002	20-07-2002	21-07-2002

O2/Ar=50/50 200wx30min
85°CStrage

ZWD6216 shows very high reliability for OLED