Module ID: **ID20160622083811**
Manufacturer: **MBJ**
Module Type/Description: **INTERSOLAR 238**
Testcenter Serial: **4005_Sandra**
Module Judgement: **CLASSD**

Job ID: Intersolar_2016
Address: Intersolar / Messegelaende
Country / City: DE 81823 Muenchen

Power

Pmpp @ STC IEC60891:	234.7W
Power missmatch:	-1.4% to 238.0W (0.0%->+5.0%)
Tmod / Tref:	27.7C / 25.5C
Flash Time:	100.5ms
Flasher Parameter:	C16480N/Mono/195ms
Lowlight Performance:	(200)=43.4W,(400)=91.1W,(600)=139.5W,(800)=187.4W
Operator / Date Time:	Schraeder 6/22/2016 8:48 AM

Electrical

Connection Check:	Successfull: 8.5A /41.2V
Diode Test:	Successfull: 10.0A /2.3V
GND Bond Tests:	PASSED 15mOhm Top
	PASSED 11mOhm Right
	PASSED 7mOhm Bottom
GND Parameter / Return:	30.00A 1.0s / Left
HiPot Test:	PASSED 6.0kV 1.0s / 0.010mA
Insulation Resistance Test:	PASSED 1000.0V 1.0s / >1000MOhm

Electroluminescence

Cell Judgement Count:	3 very critical: >=20% cell area affected
	44 critical: <20% cell area affected
	4 uncritical: no cell area affected
	0 other EL abnormalities
No Judgment Count:	9
EL Parameter:	1.7s / 43.1V / 12.0A / Cell / Assisted no Setup
Operator / Date Time:	Schraeder 6/22/2016 8:38 AM
Reviewed / Date Time:	Schraeder 7/18/2016 1:45 PM

Thermography

Thermography Images:	6 dT max.: 12.7°C
Operator / Date Time:	Schraeder 7/18/2016 1:42 PM

Photography

Images:	3
Operator / Date Time:	Schraeder 6/23/2016 1:11 PM

Module ID: **ID20160622083811**

Comment

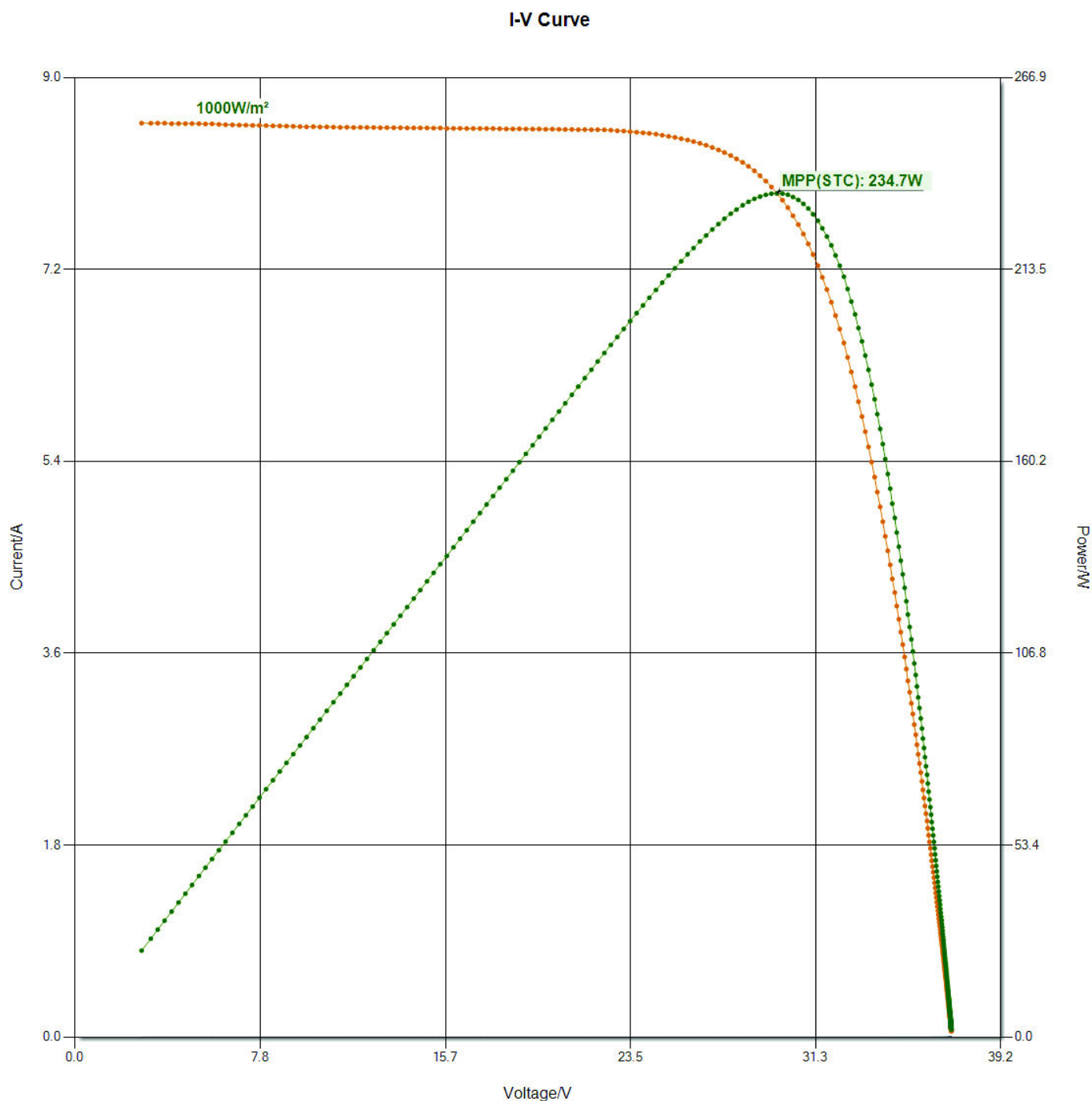Operator / Date Time: Schraeder 6/22/2016 8:58 AM

Judgment Comment:
Due to several critical cracks the panel is D class judged

Module Comment:
Strongly cracked panel, several critical cells.

MBJ

Power

Module ID: ID20160622083811

Type ID: MBJ / INTERSOLAR 238

I-V Curve

	Pmpp[W]	Impp[A]	Umpp[V]	Isc[A]	Uoc[V]	Irr[W/m2]	FF[%]
IEC60891 STC	234.7	7.91	29.67	8.56	37.10	1000.0	73.9
Measured	230.6	7.85	29.36	8.50	36.74	991.9	73.8

Tmod[C]:27.7	Tref[C]:25.5	Tdev[C]:26.1	Tout[C]:21.7	T[ms]:100.5
Type:Mono	alpha[%]:0.070	beta[%]:-0.350	IEC aICF:0.060	IEC Rs:0.60
Software:527m				

Power

Module ID: ID20160622083811

Type ID: MBJ / INTERSOLAR 238

I-V Curve
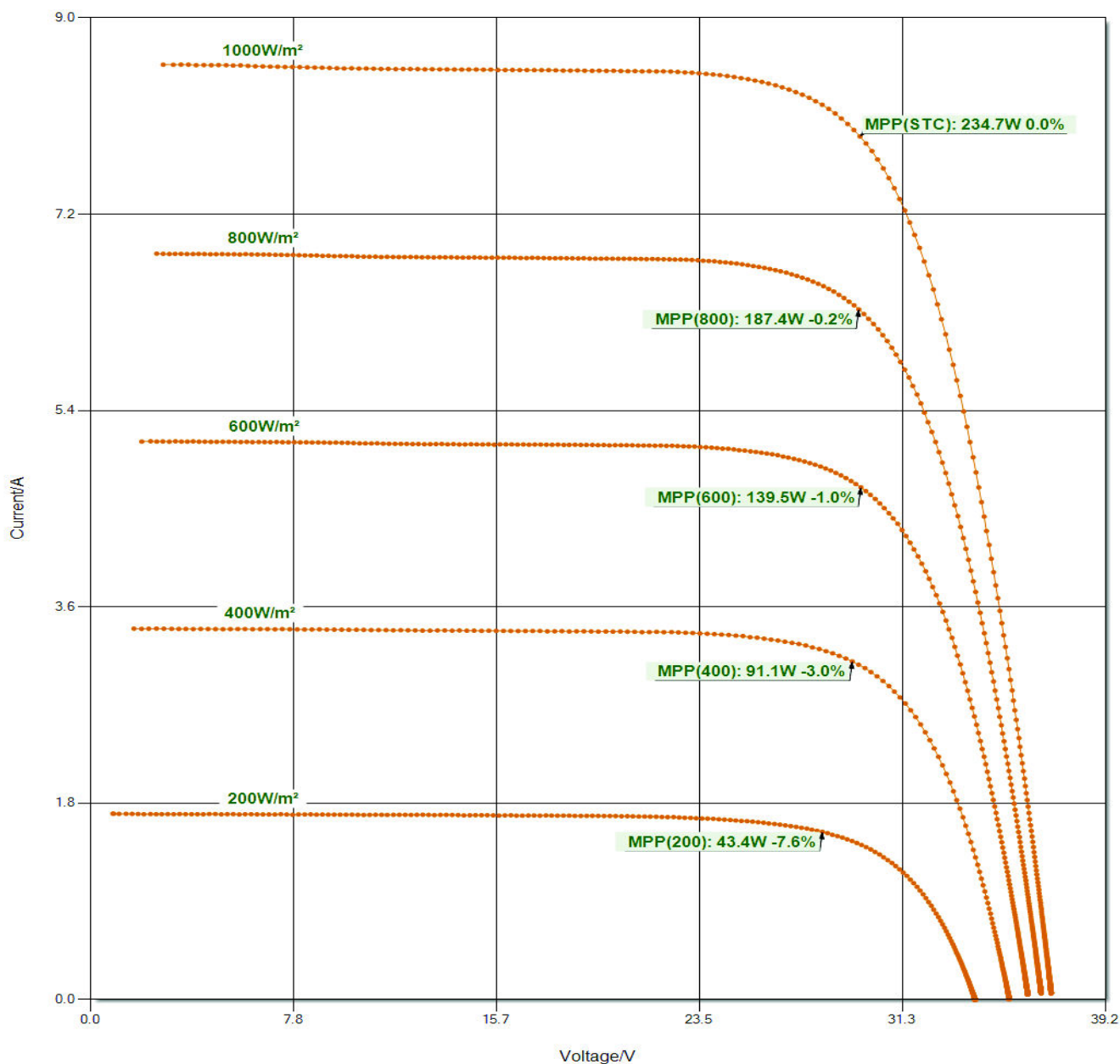
IEC60891 Irr [W/m2]	200	400	600	800	1000
IEC60891 Pmpp [W]	43.4	91.1	139.5	187.4	234.7
Module Eff [%]	13.5	14.2	14.5	14.6	14.7
Norm. Delta [%]	-7.6	-3.0	-1.0	-0.2	0.0
Measured [W/m2]	197.4	394.7	591.4	791.7	991.9

Module Width/Height (Portrait) [mm]:982*1630

Electroluminescence for ID20160622083811
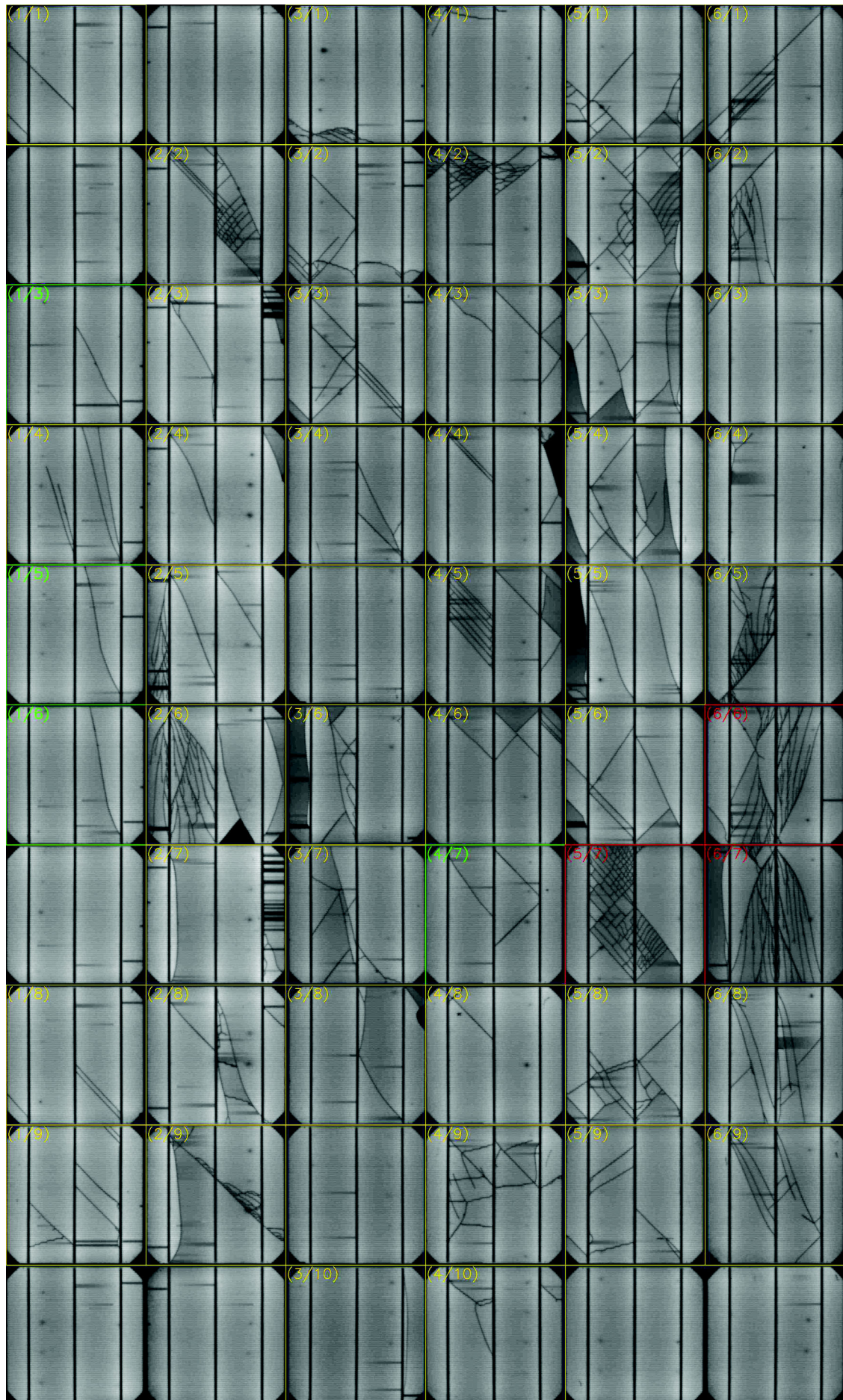
Current/A: 12.010

Voltage/V: 43.120

Exposure Time [ms]: 1700

Schraeder 6/22/2016 8:38 AM

EL Image of Cell (1/1)
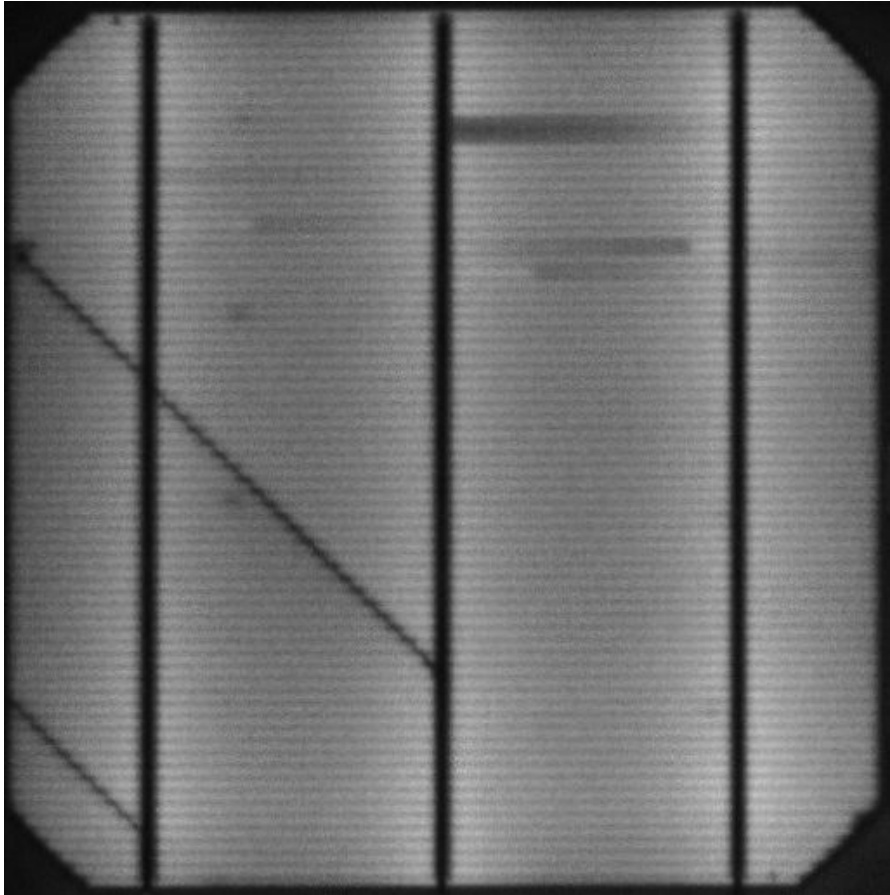
critical: <20% cell area affected

Affected Area of Cell (1/1): 1.91%
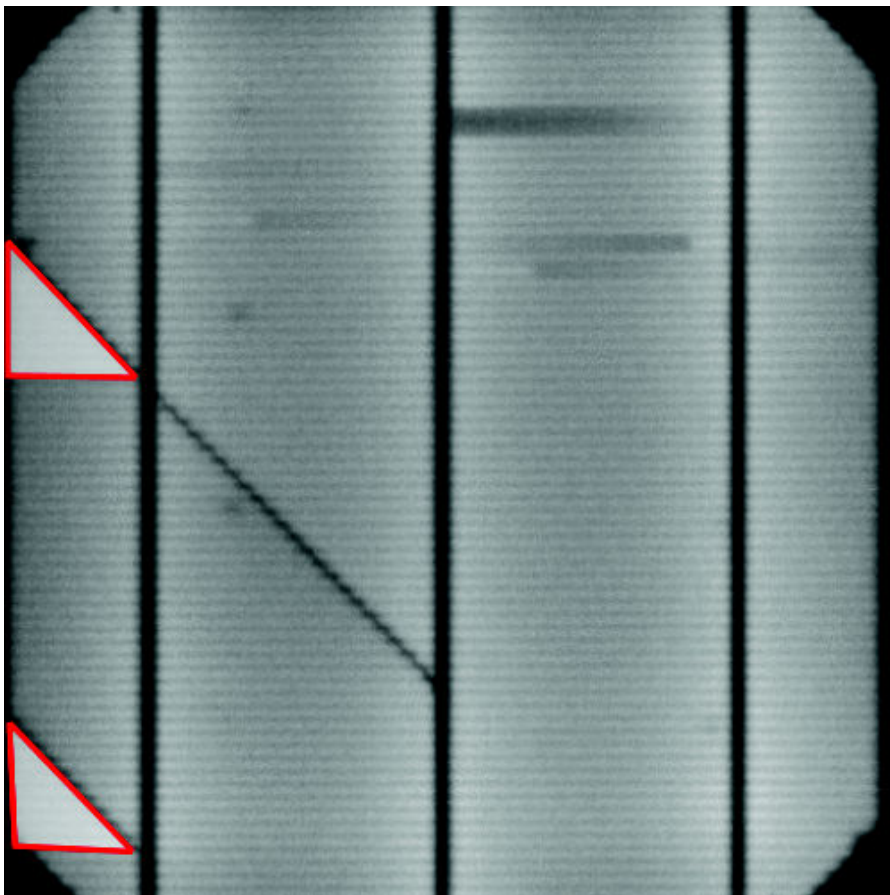
EL Image of Cell (1/3)
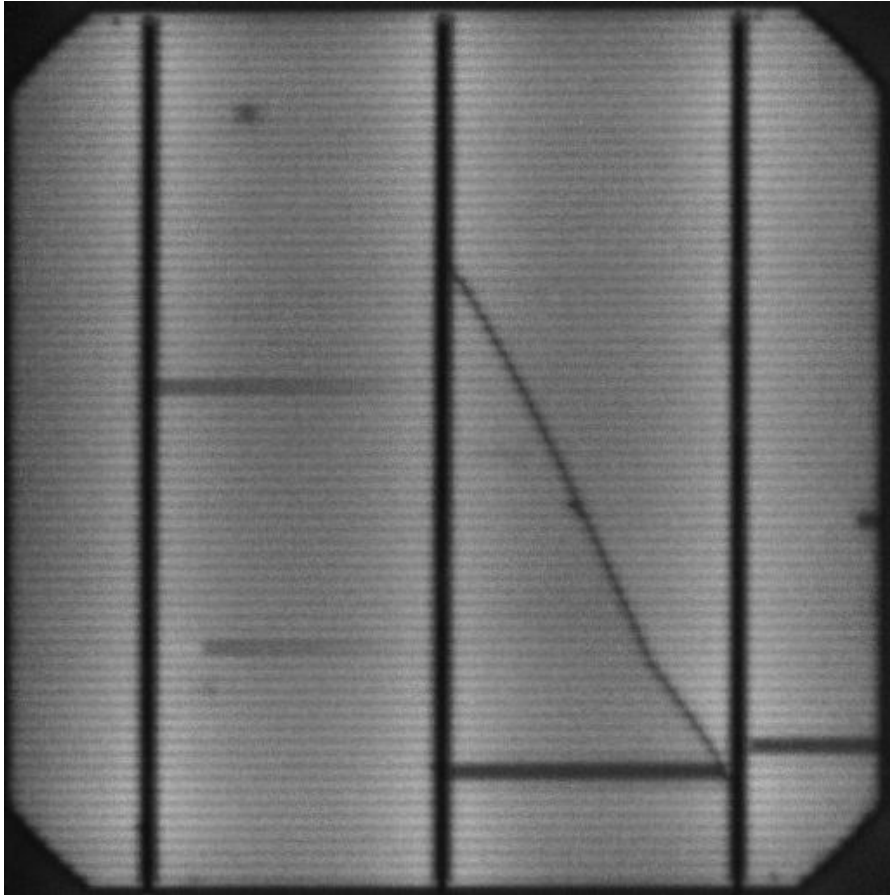
uncritical: no cell area affected

EL Image of Cell (1/4)
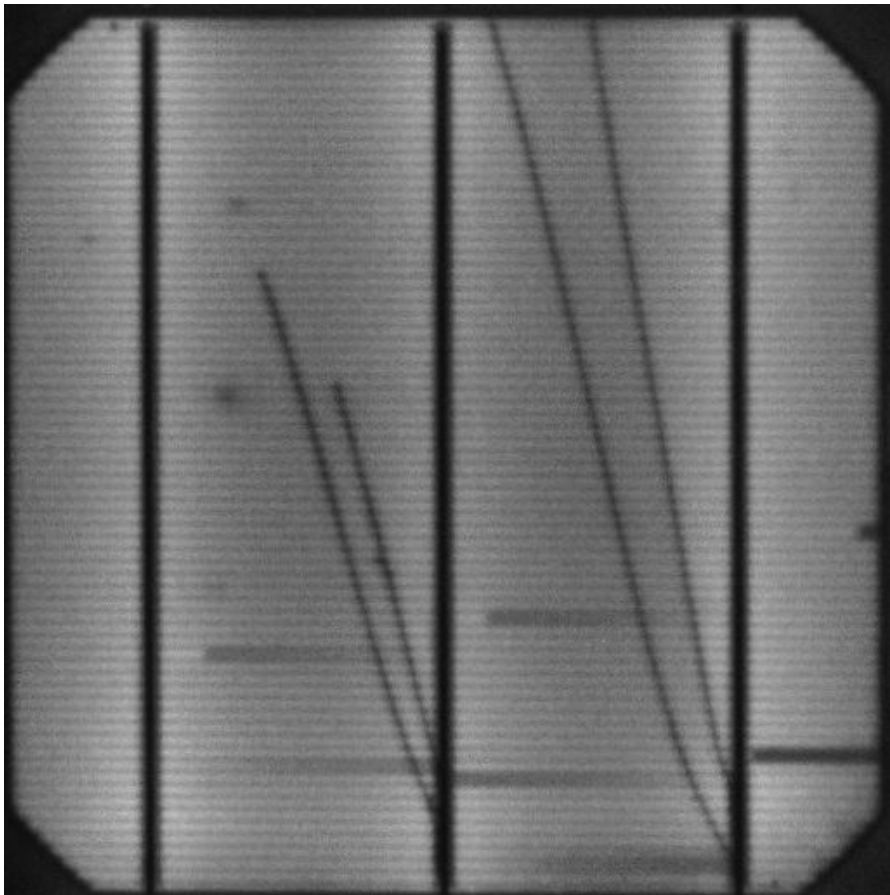
critical: <20% cell area affected
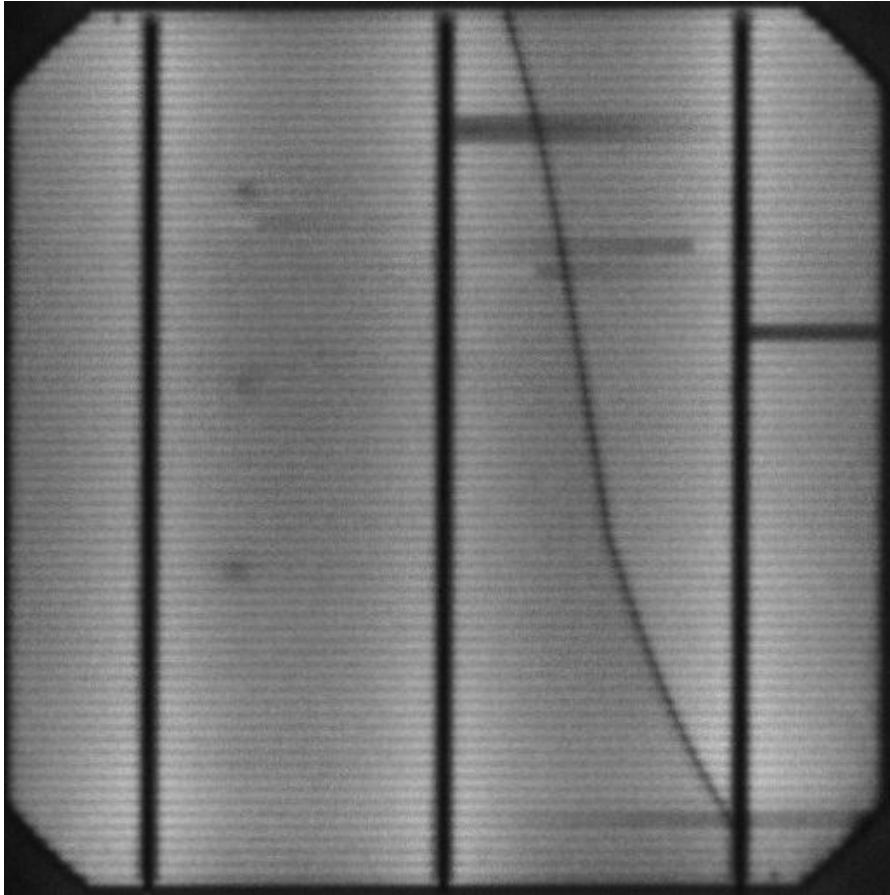
EL Image of Cell (1/5)

uncritical: no cell area affected

EL Image of Cell (1/6)
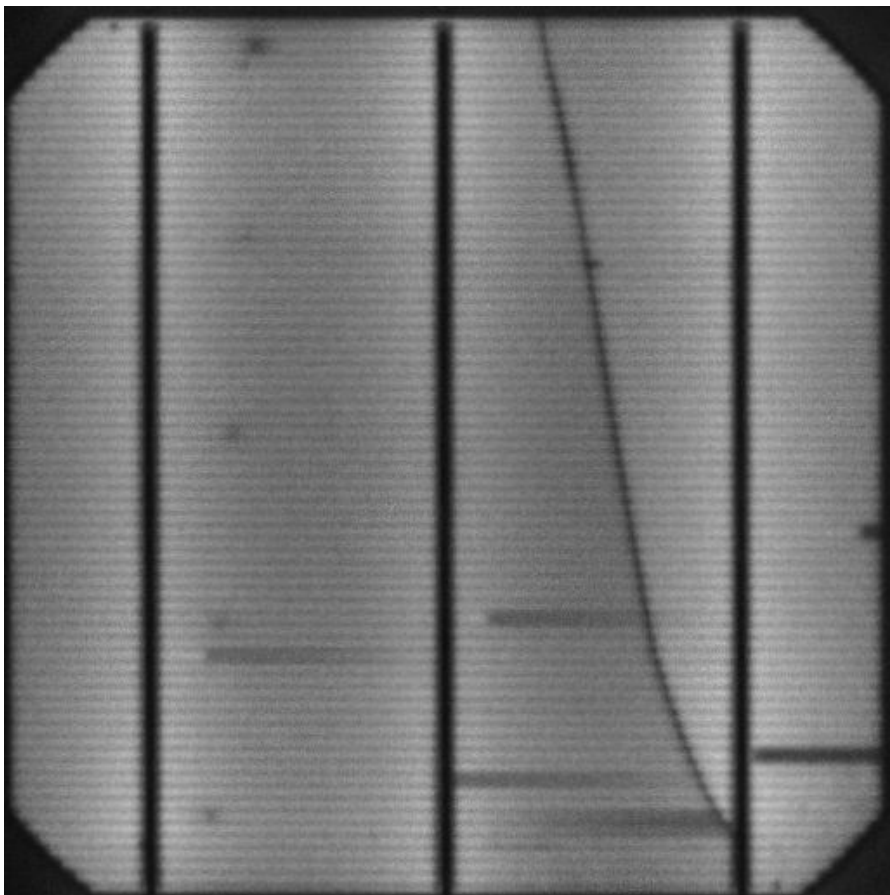
uncritical: no cell area affected
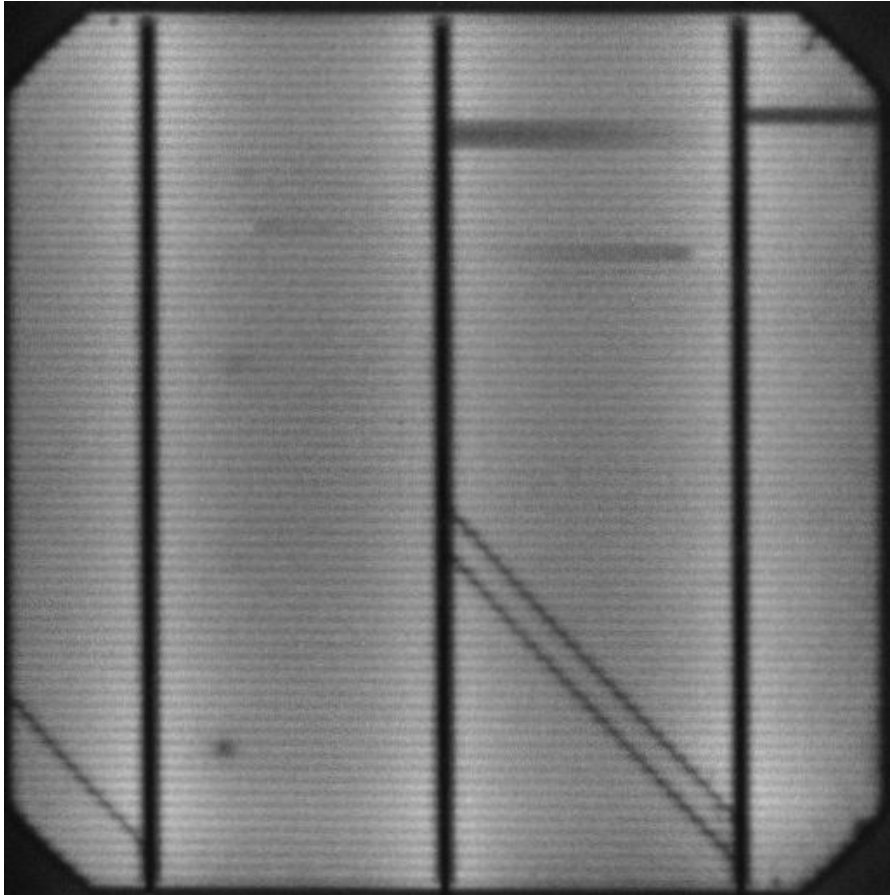
EL Image of Cell (1/8)

critical: <20% cell area affected

EL Image of Cell (1/9)
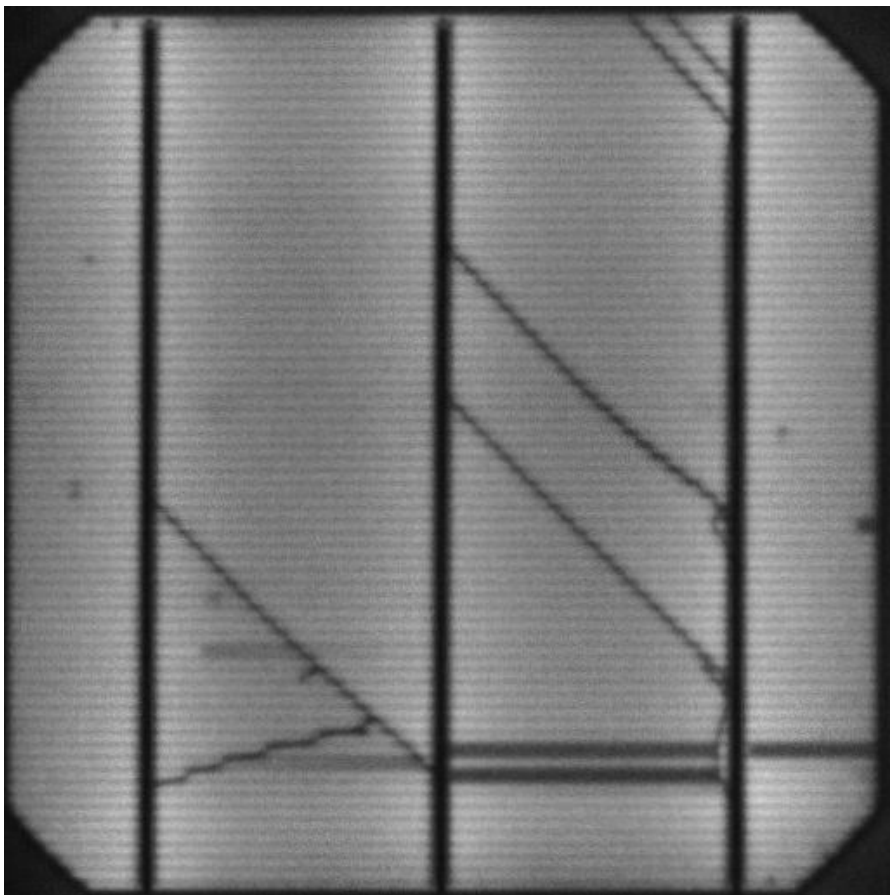
critical: <20% cell area affected
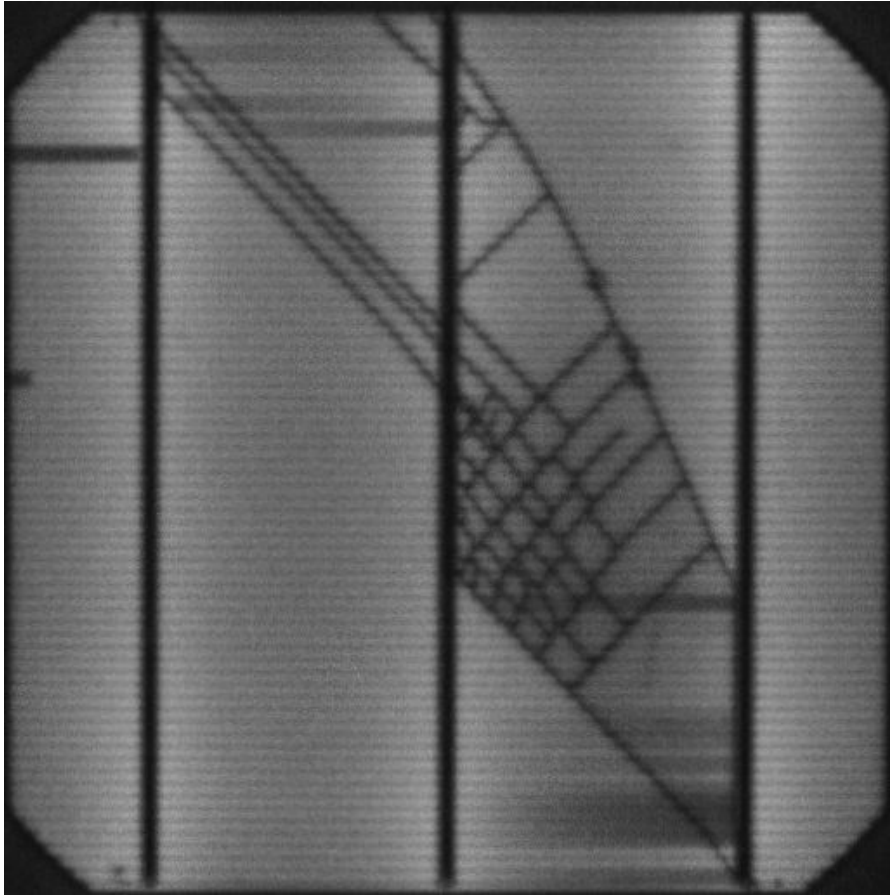
EL Image of Cell (2/2)

critical: <20% cell area affected

EL Image of Cell (2/3)
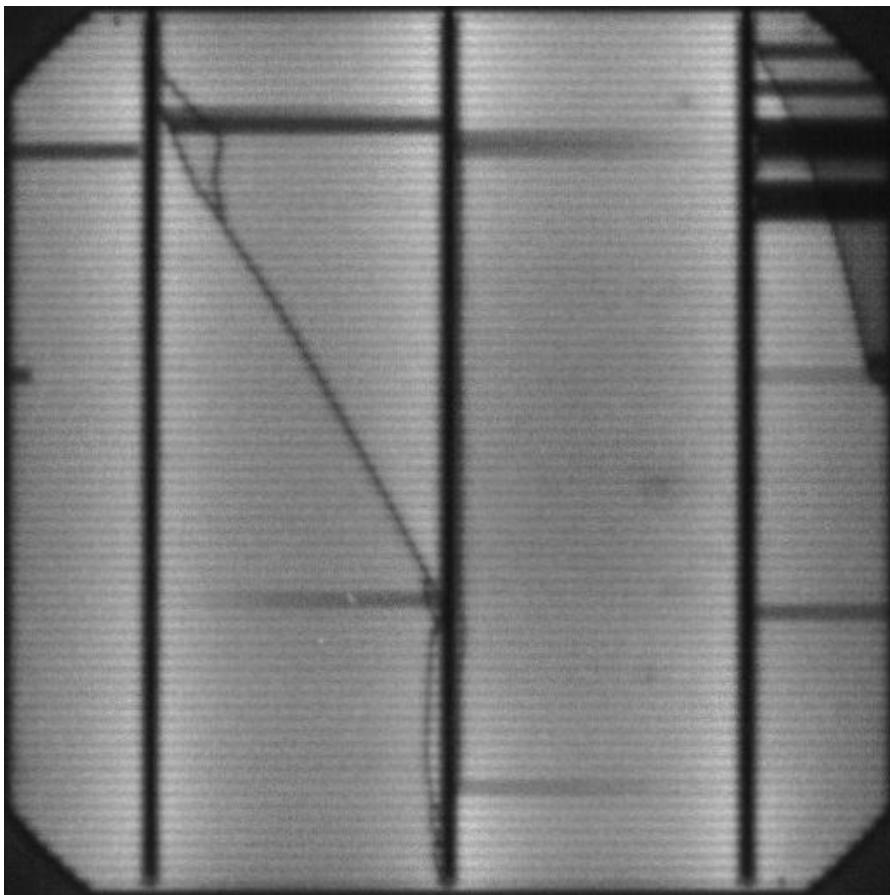
critical: <20% cell area affected

EL Image of Cell (2/4)

critical: <20% cell area affected

EL Image of Cell (2/5)
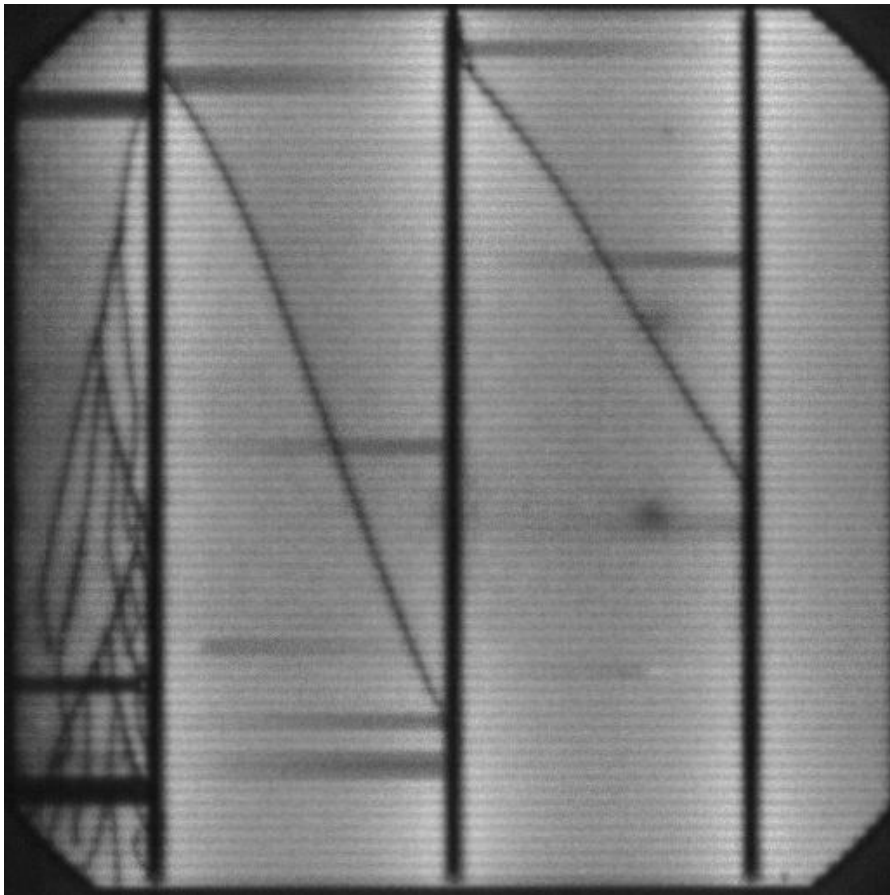
critical: <20% cell area affected

EL details for ID20160622083811

EL Image of Cell (2/6)
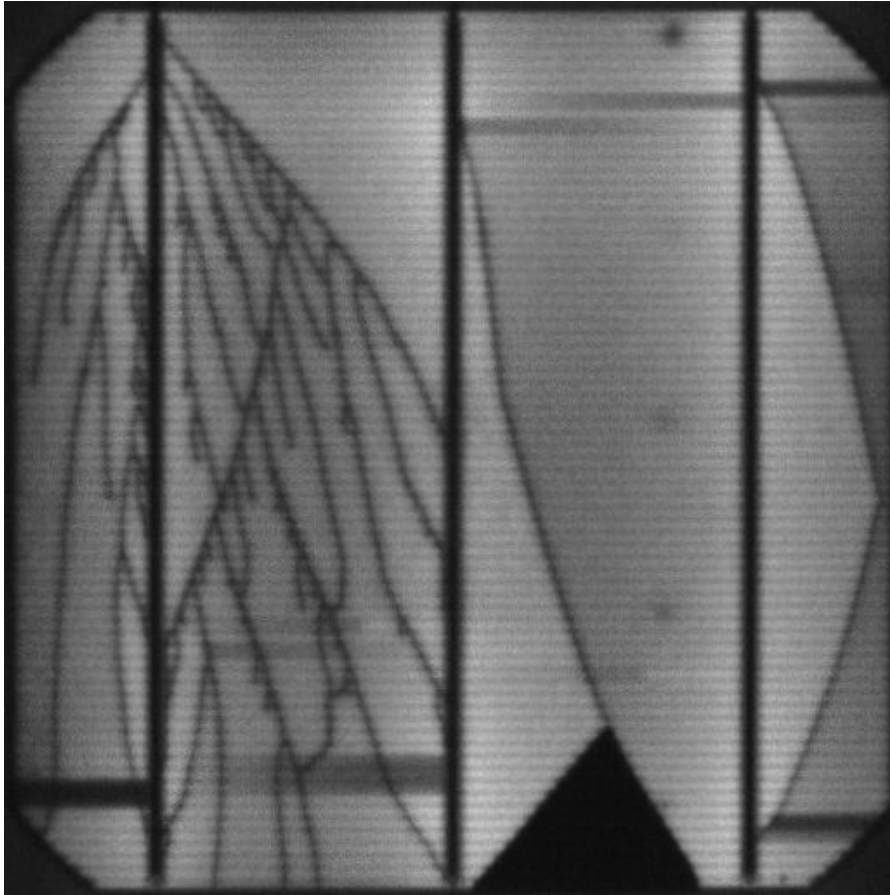
critical: <20% cell area affected

EL Image of Cell (2/7)
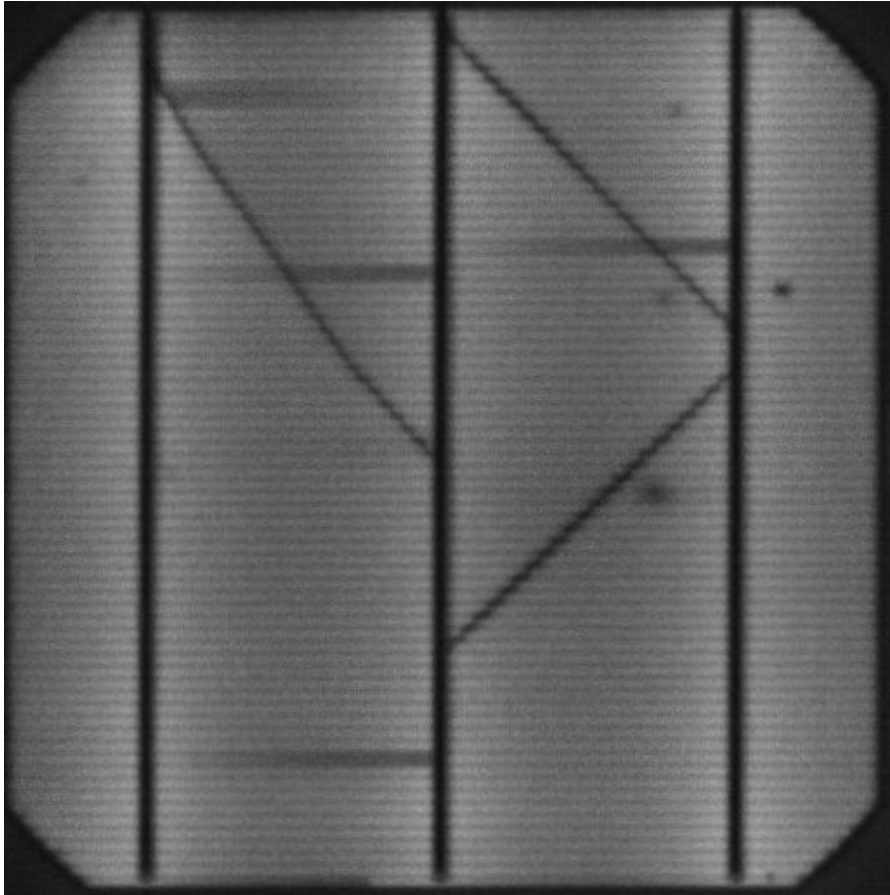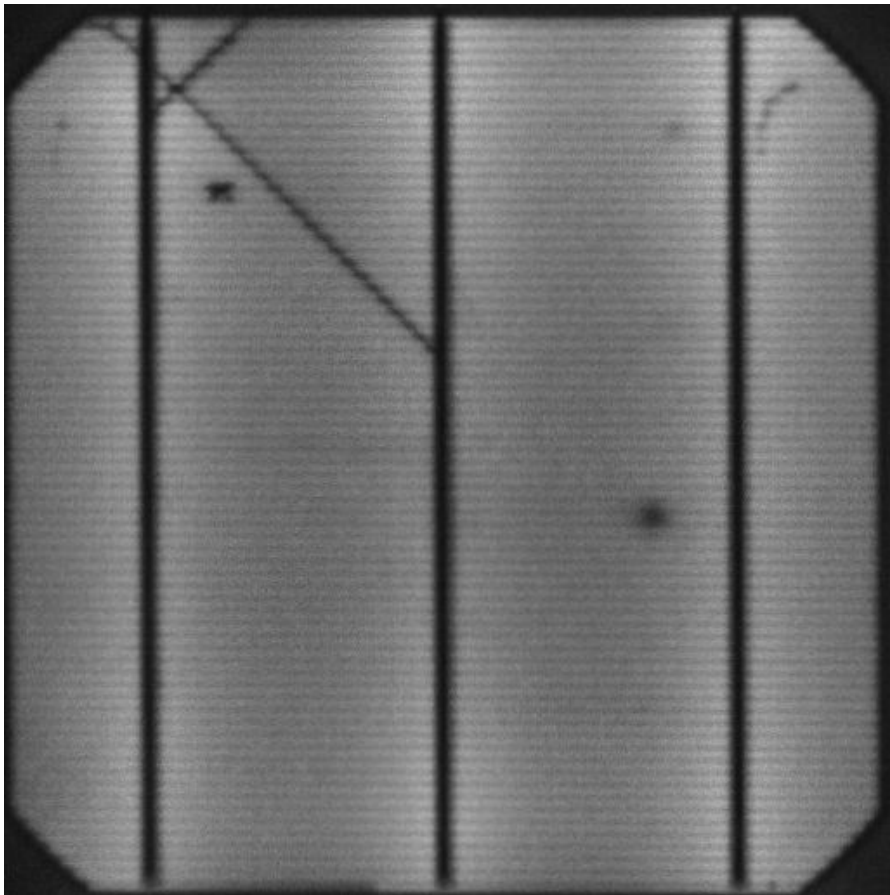

critical: <20% cell area affected
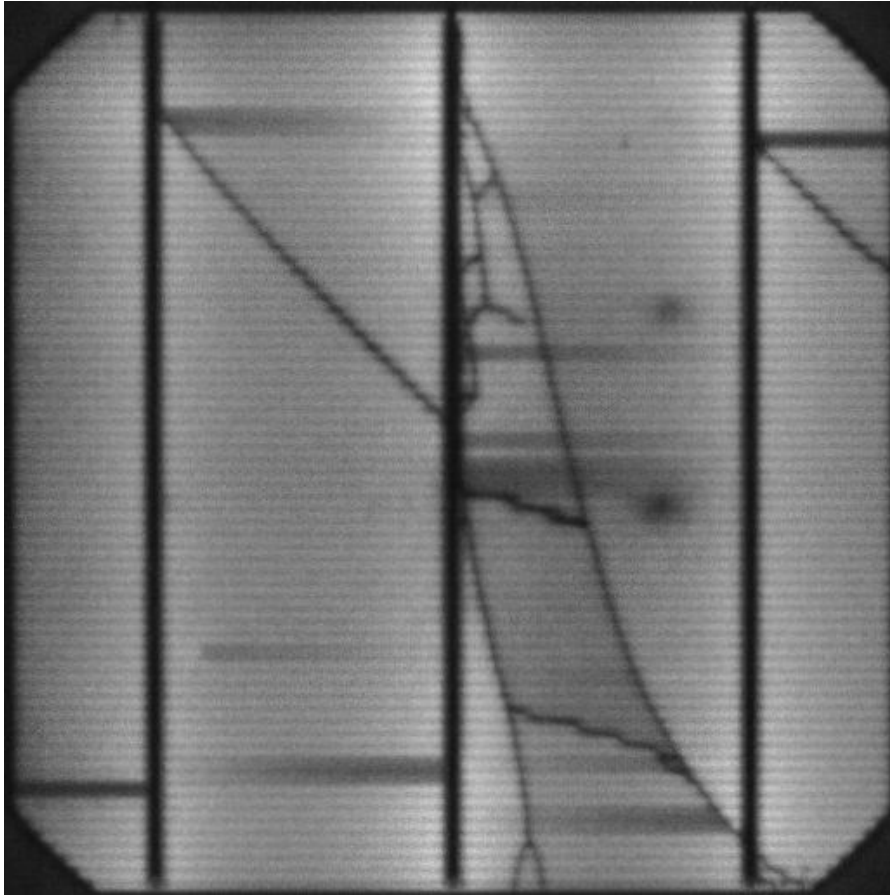
EL Image of Cell (2/8)

critical: <20% cell area affected

EL Image of Cell (2/9)
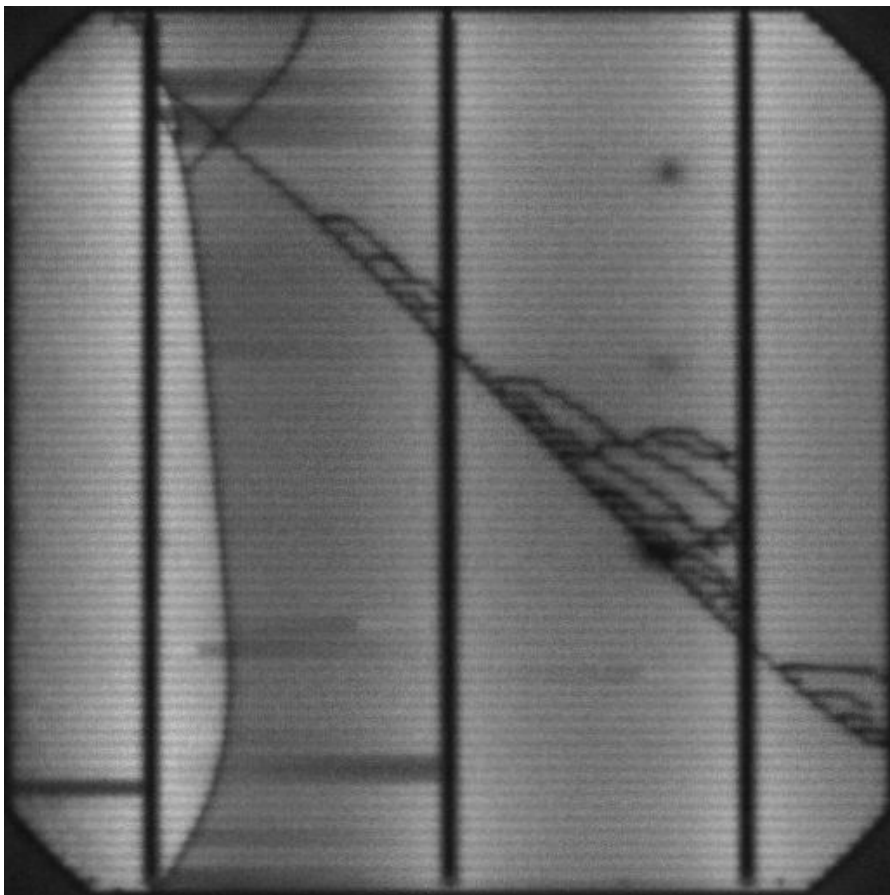
critical: <20% cell area affected

EL Image of Cell (3/1)

critical: <20% cell area affected

EL Image of Cell (3/2)
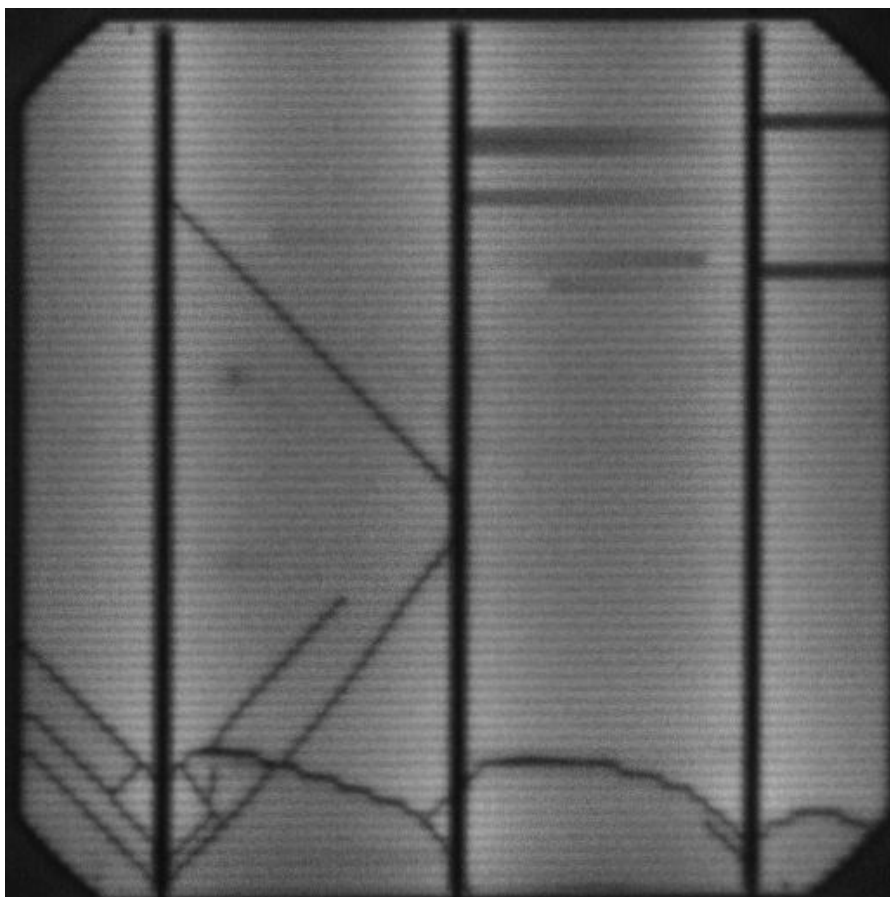
critical: <20% cell area affected
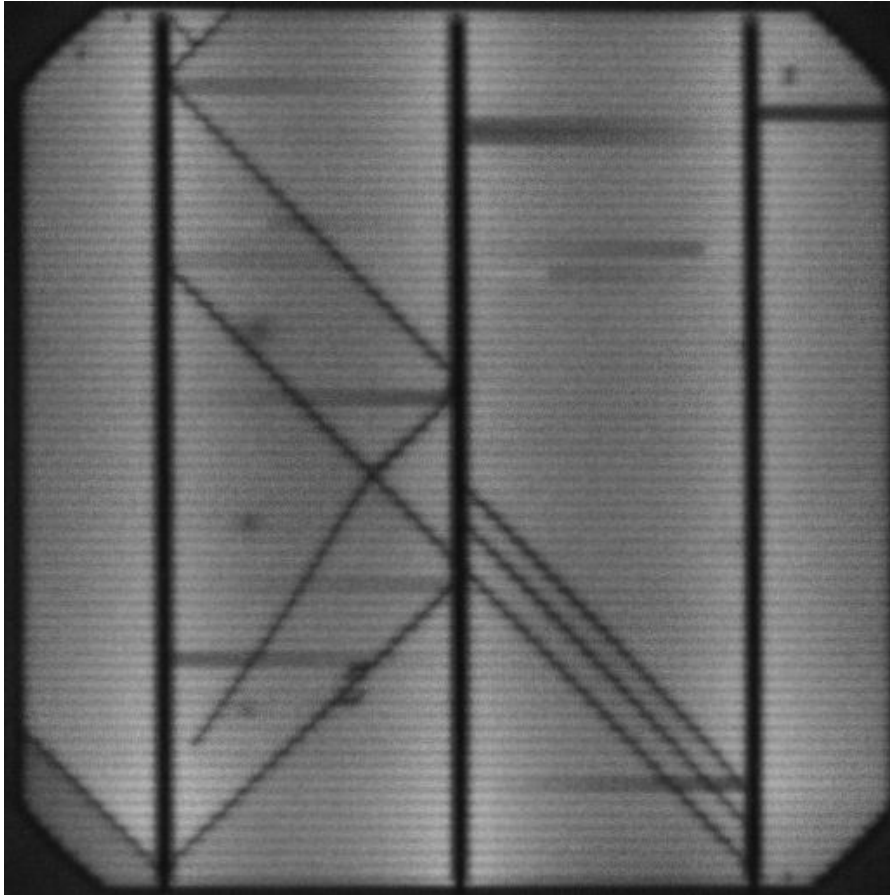
EL Image of Cell (3/3)

critical: <20% cell area affected

EL Image of Cell (3/4)
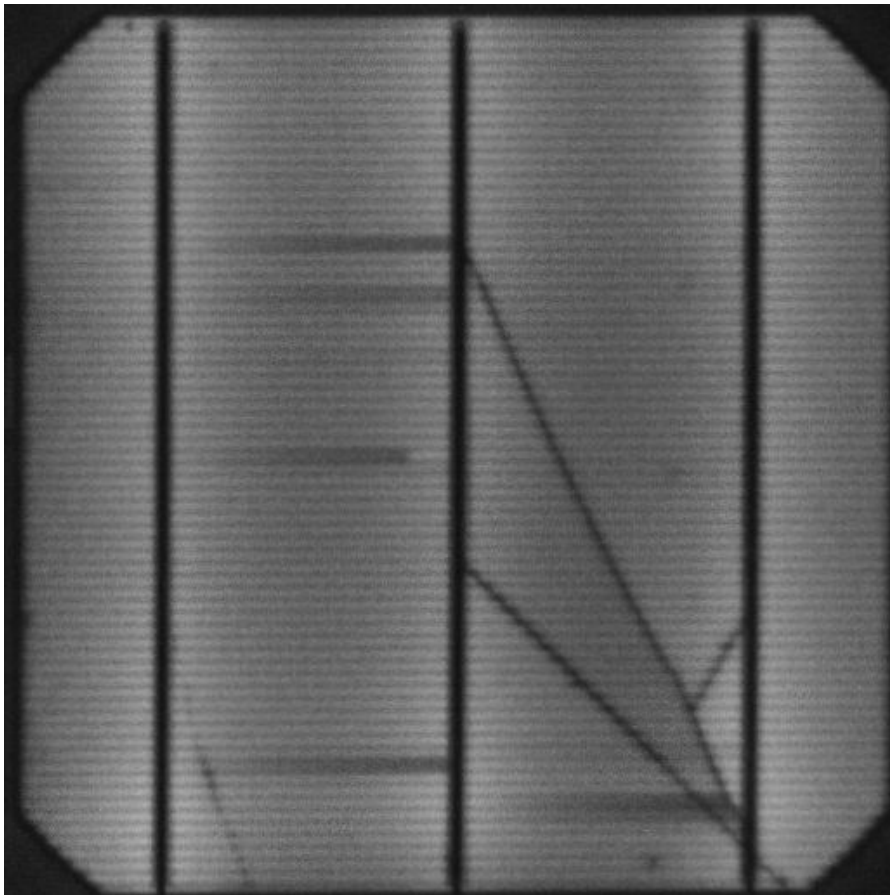
critical: <20% cell area affected
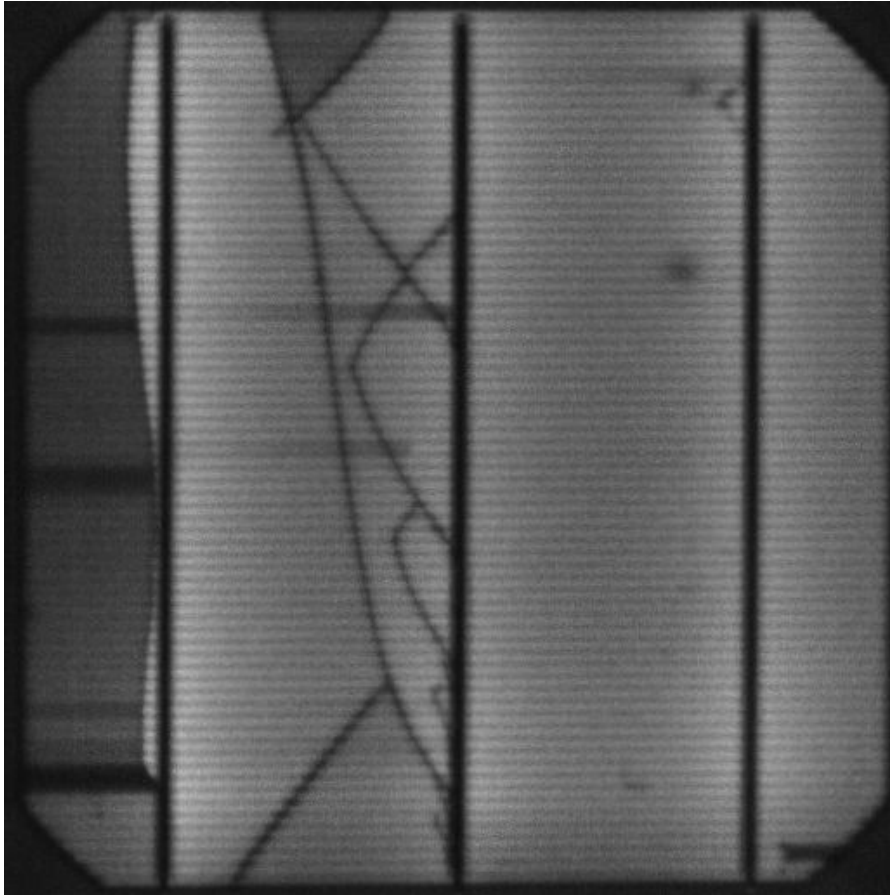
EL Image of Cell (3/6)

critical: <20% cell area affected

EL Image of Cell (3/7)
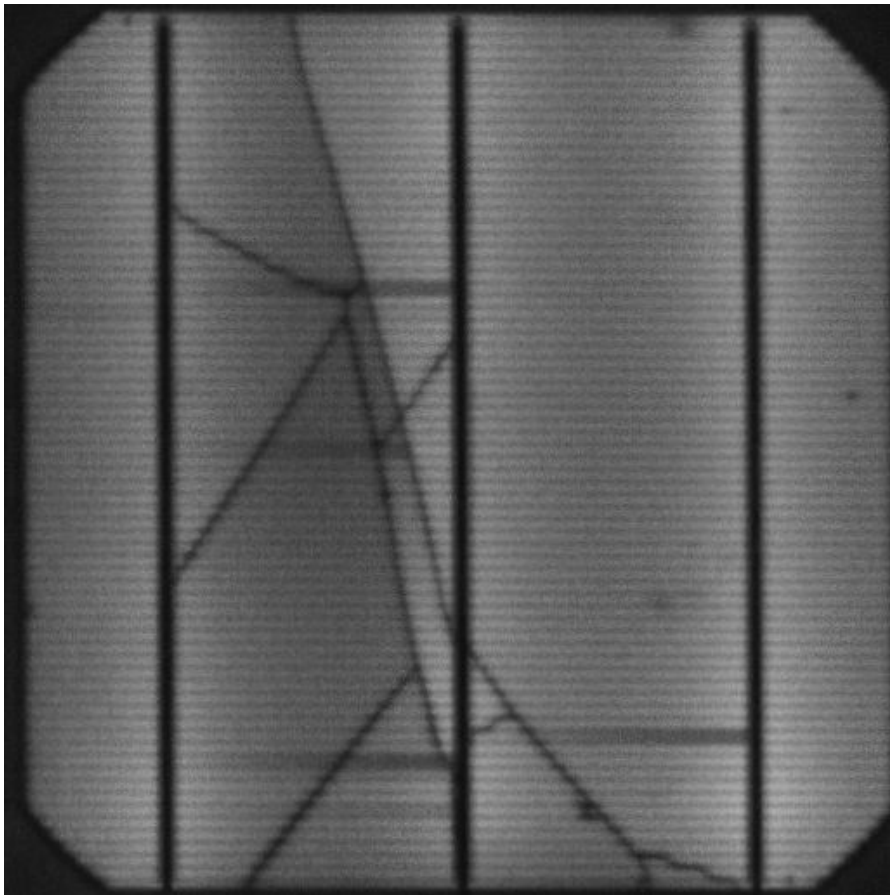
critical: <20% cell area affected
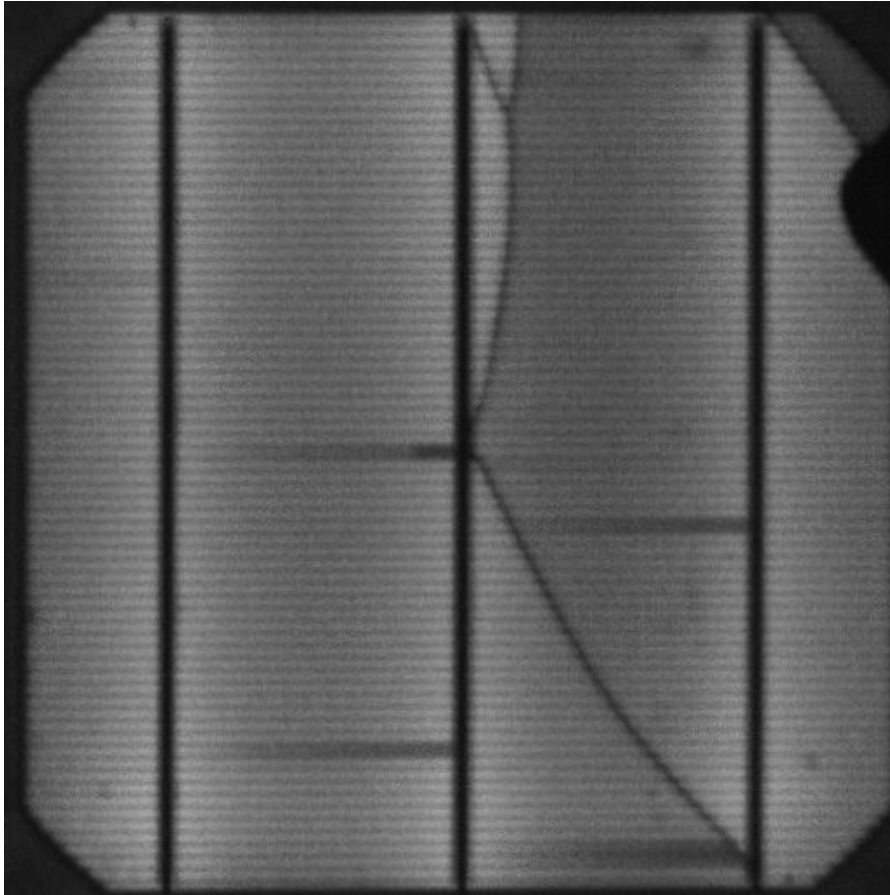
EL Image of Cell (3/8)

critical: <20% cell area affected

EL Image of Cell (3/10)
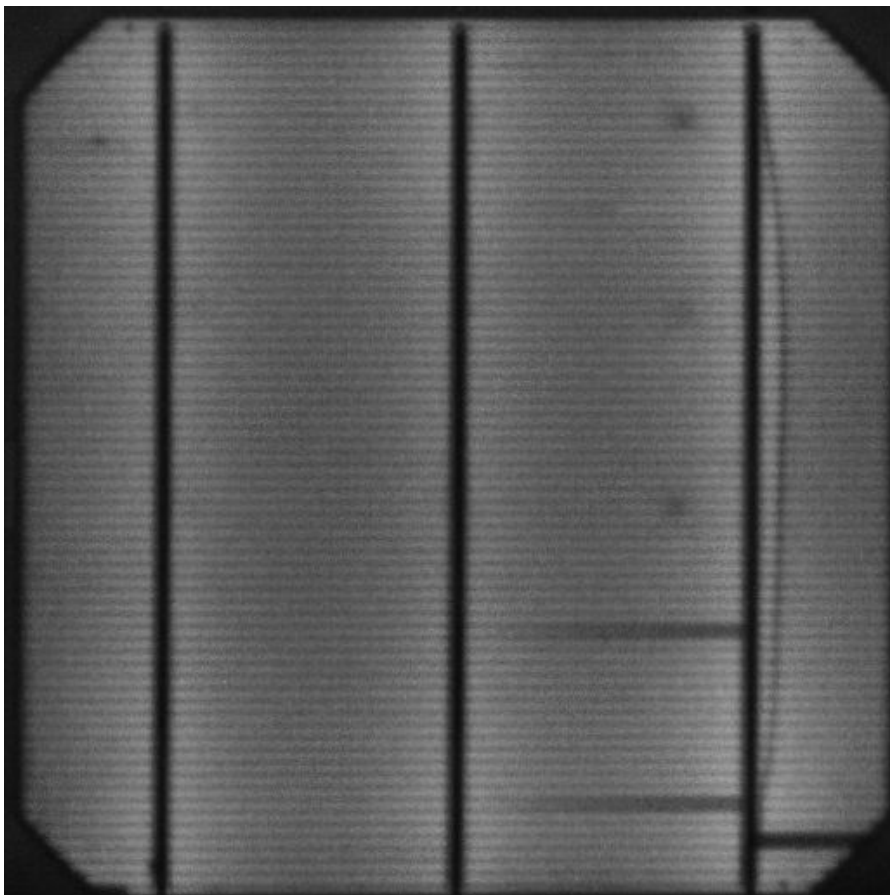
critical: <20% cell area affected
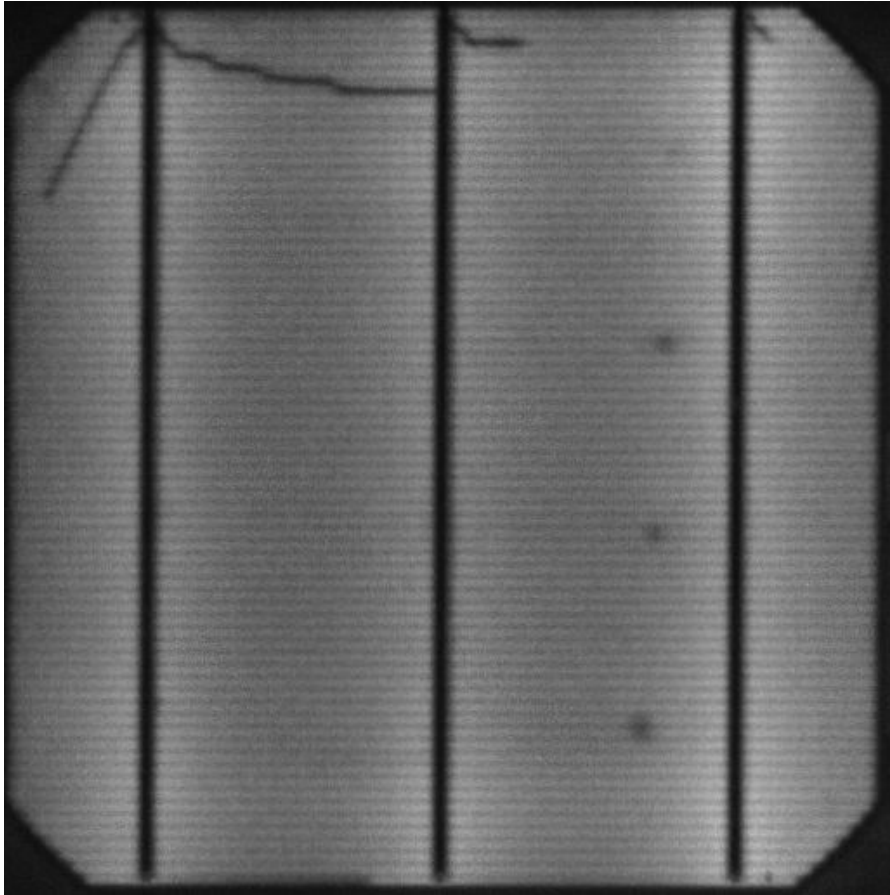
EL Image of Cell (4/1)

critical: <20% cell area affected

EL Image of Cell (4/2)
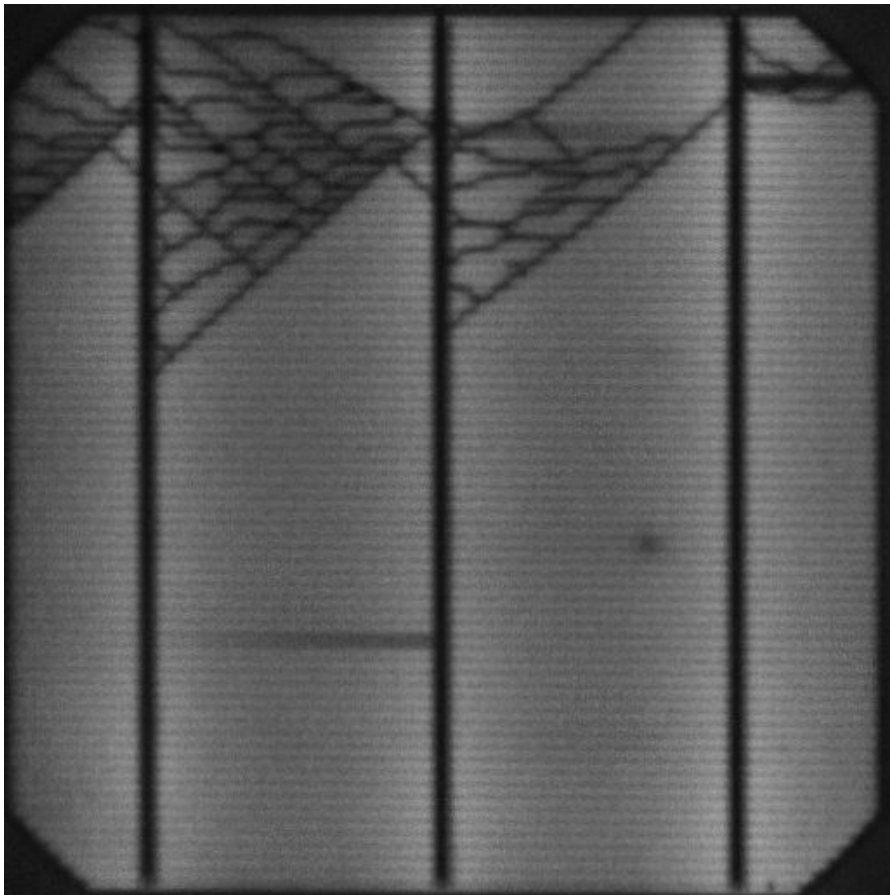
critical: <20% cell area affected
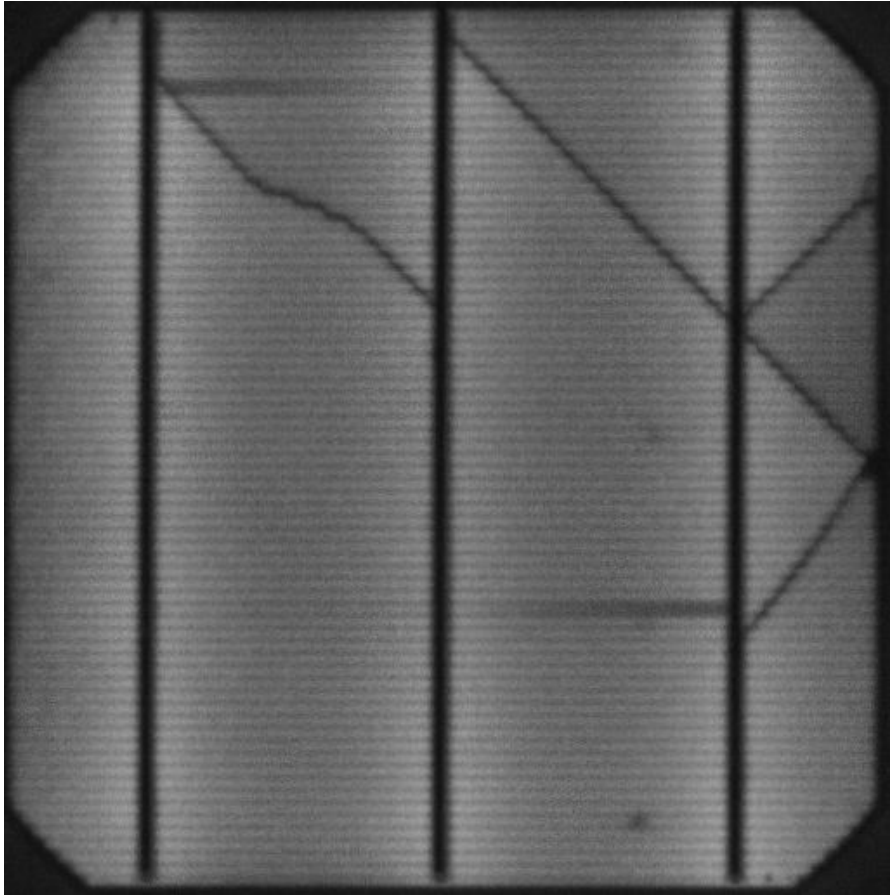
EL Image of Cell (4/3)

critical: <20% cell area affected

EL Image of Cell (4/4)
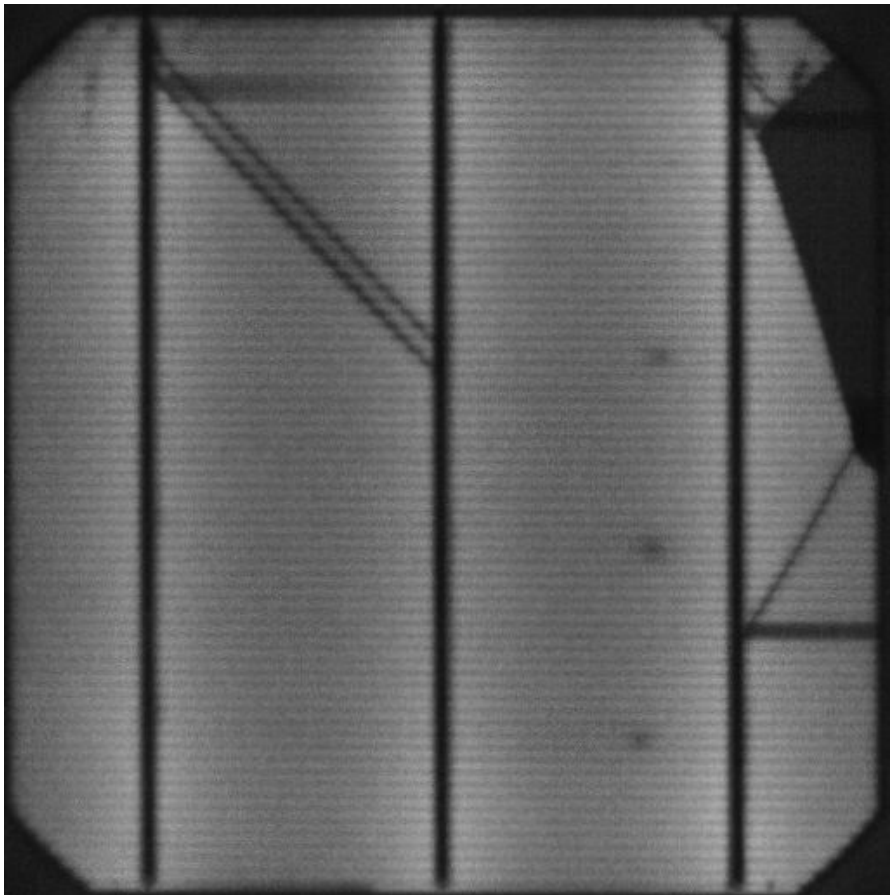
critical: <20% cell area affected
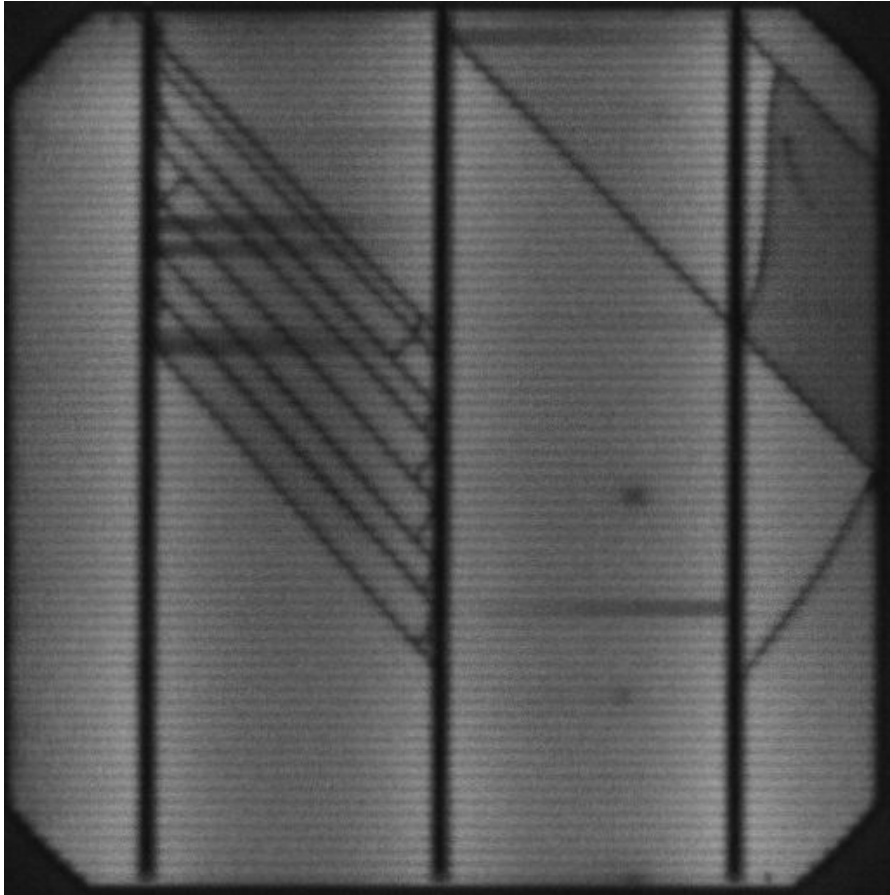
EL Image of Cell (4/5)

critical: <20% cell area affected

EL Image of Cell (4/6)
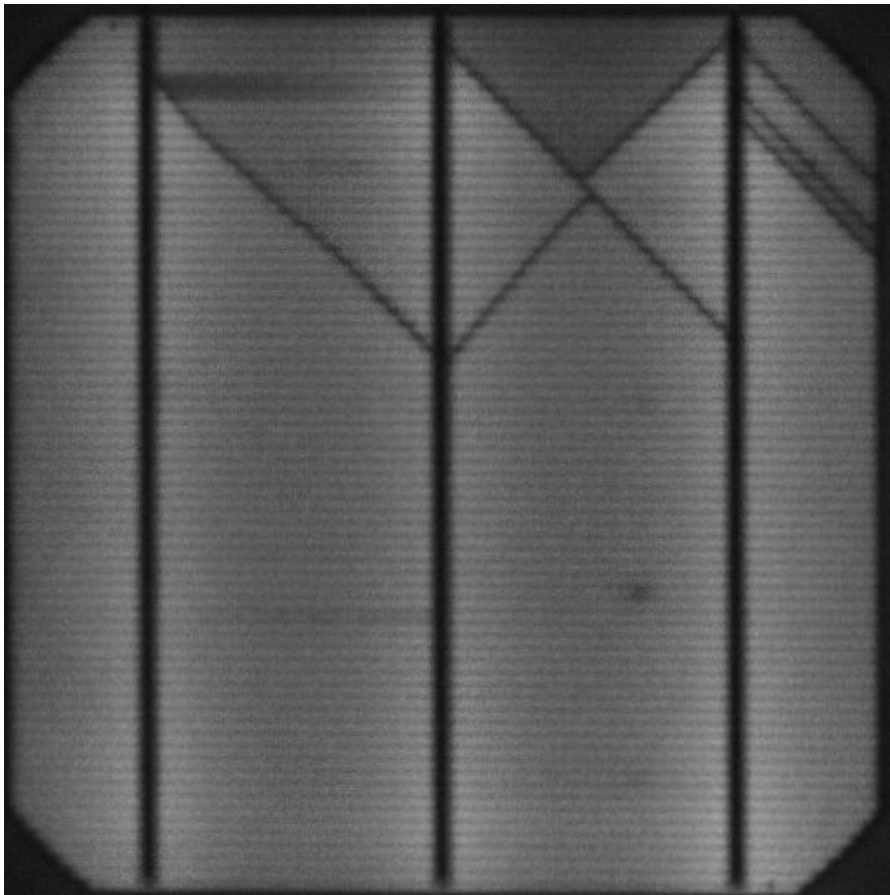
critical: <20% cell area affected

EL Image of Cell (4/7)

uncritical: no cell area affected

EL Image of Cell (4/8)

critical: <20% cell area affected
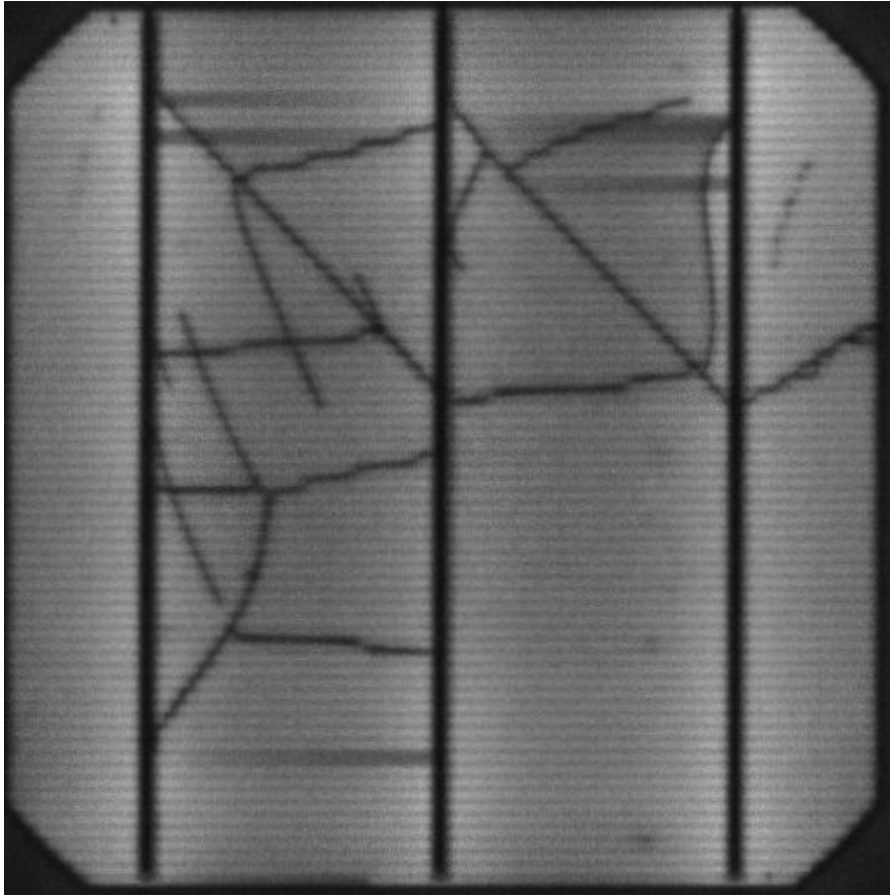
EL Image of Cell (4/9)

critical: <20% cell area affected

EL Image of Cell (4/10)
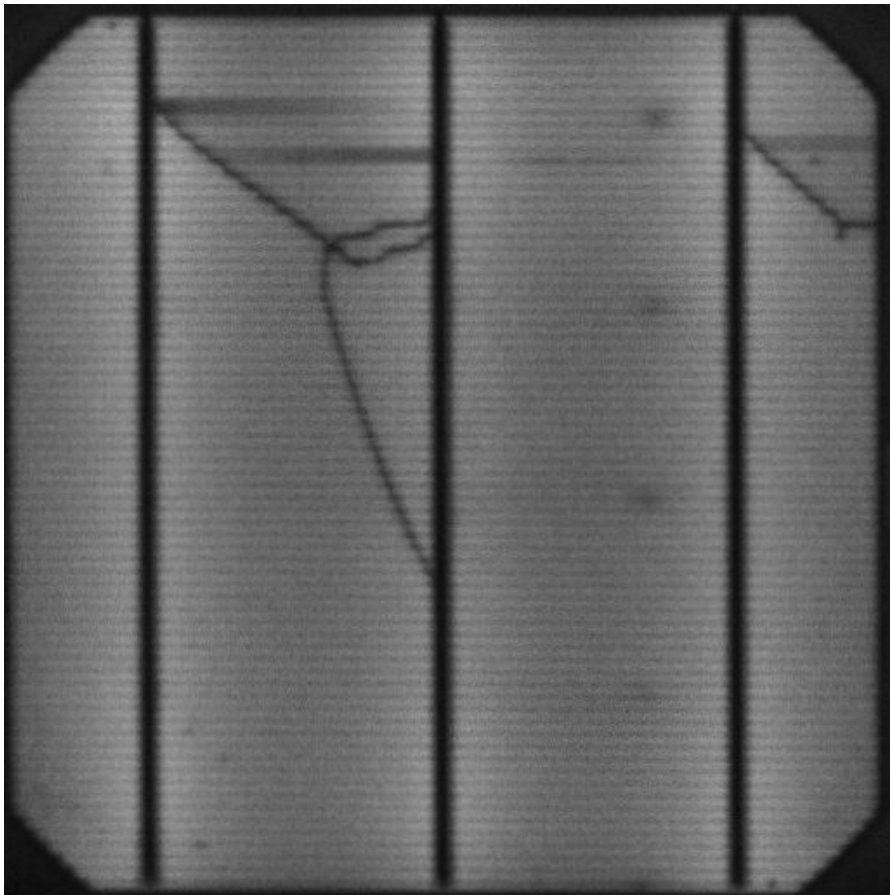
critical: <20% cell area affected
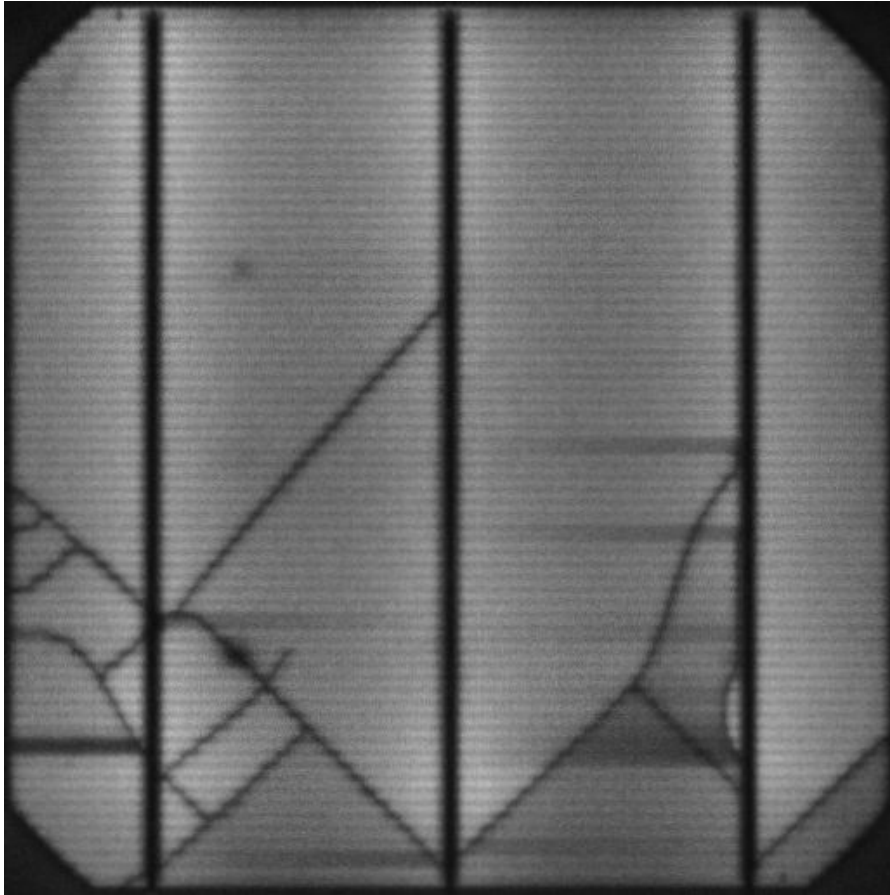
EL Image of Cell (5/1)

critical: <20% cell area affected

EL Image of Cell (5/2)
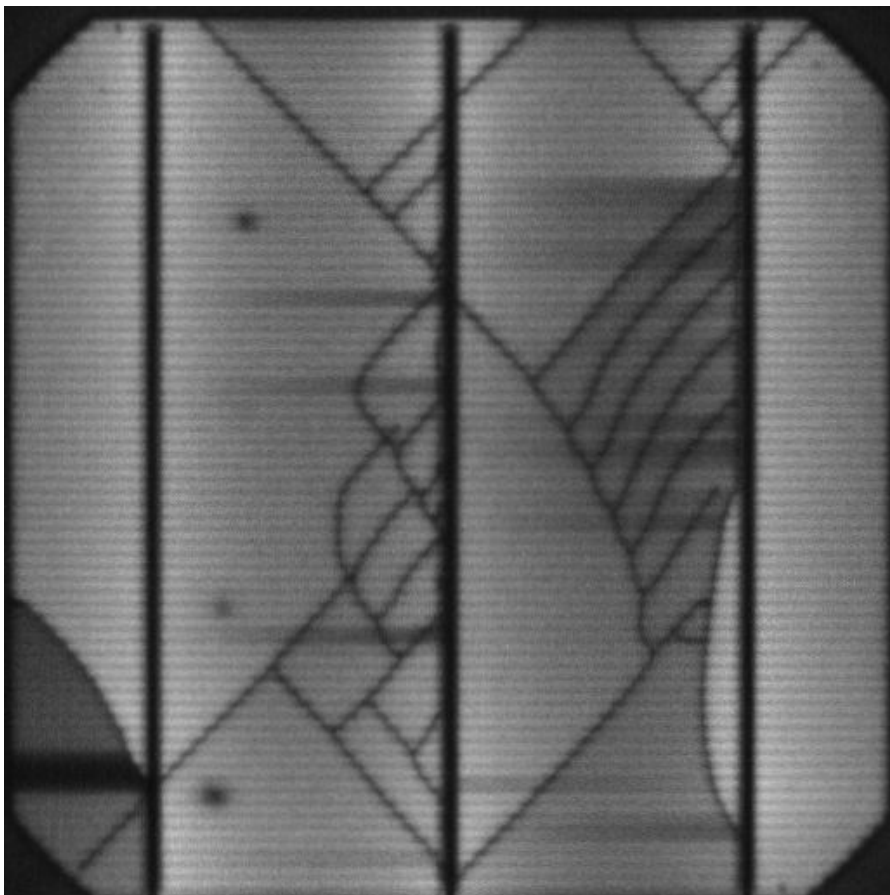
critical: <20% cell area affected
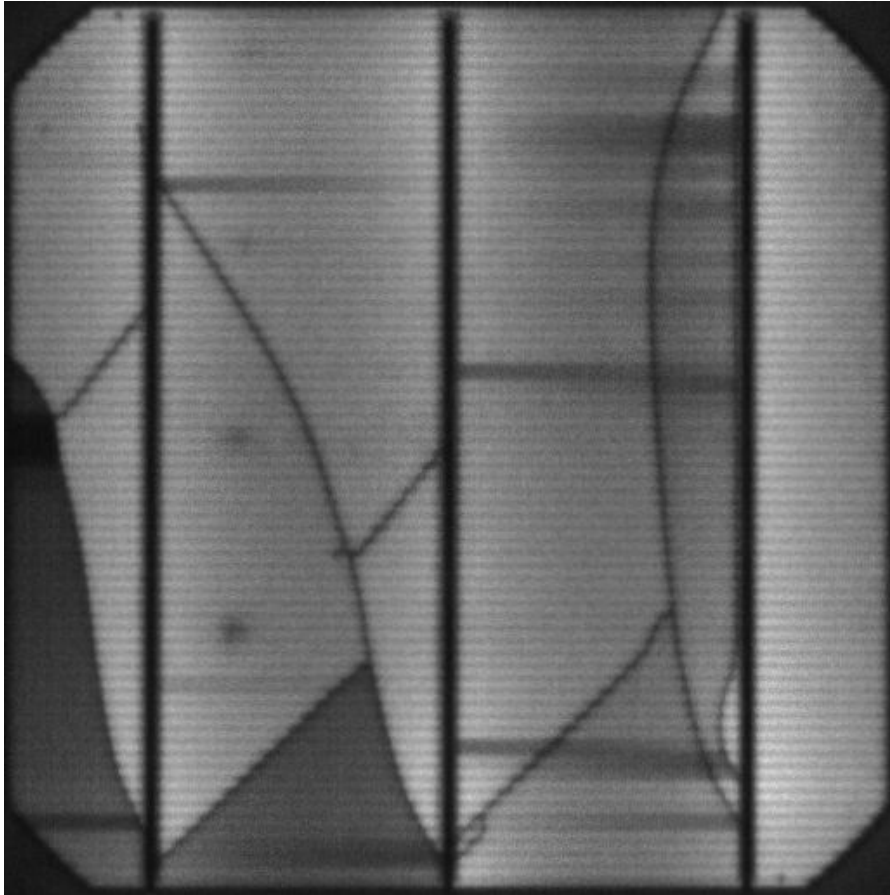
EL Image of Cell (5/3)

critical: <20% cell area affected

EL Image of Cell (5/4)
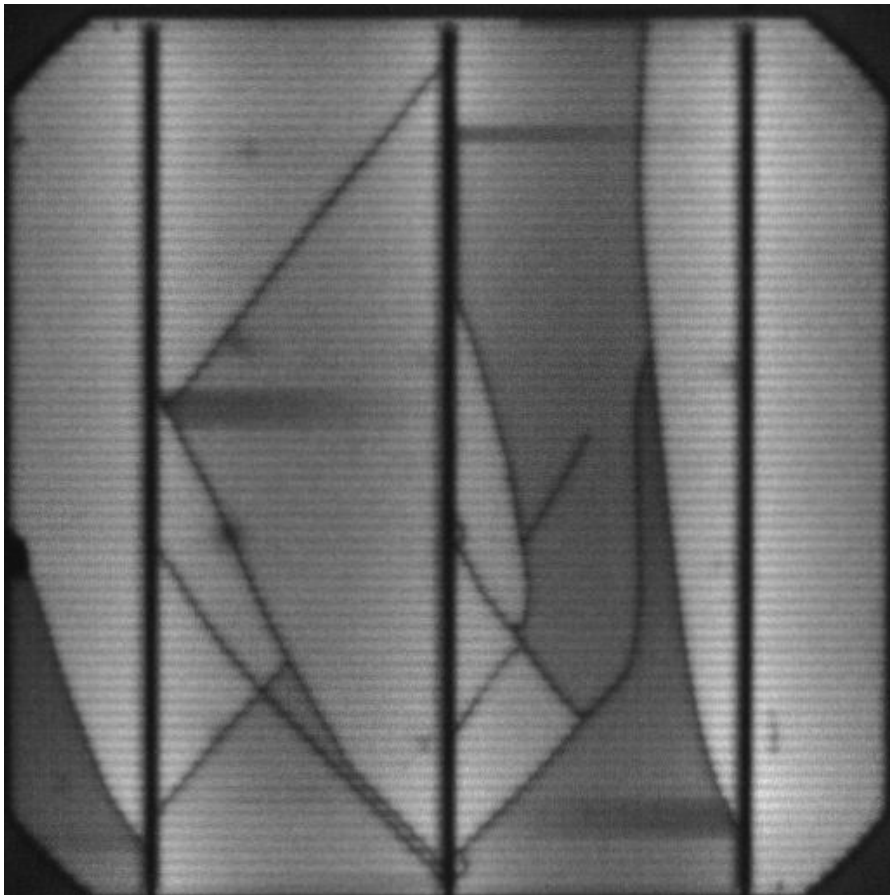
critical: <20% cell area affected
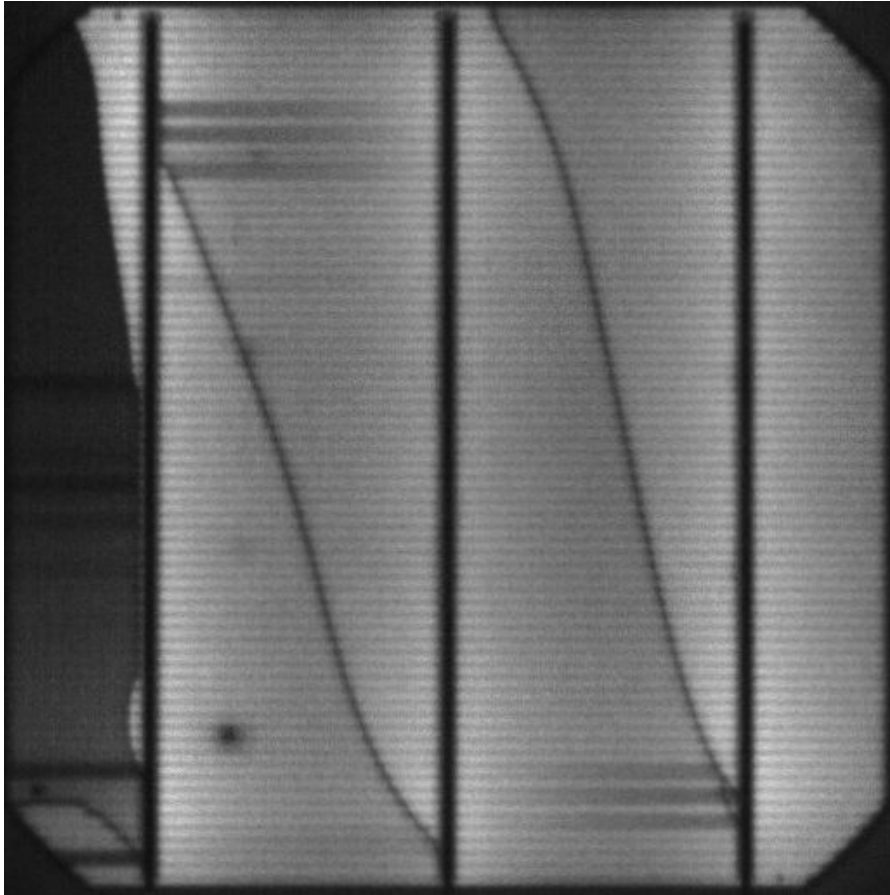
EL Image of Cell (5/5)

critical: <20% cell area affected

EL Image of Cell (5/6)
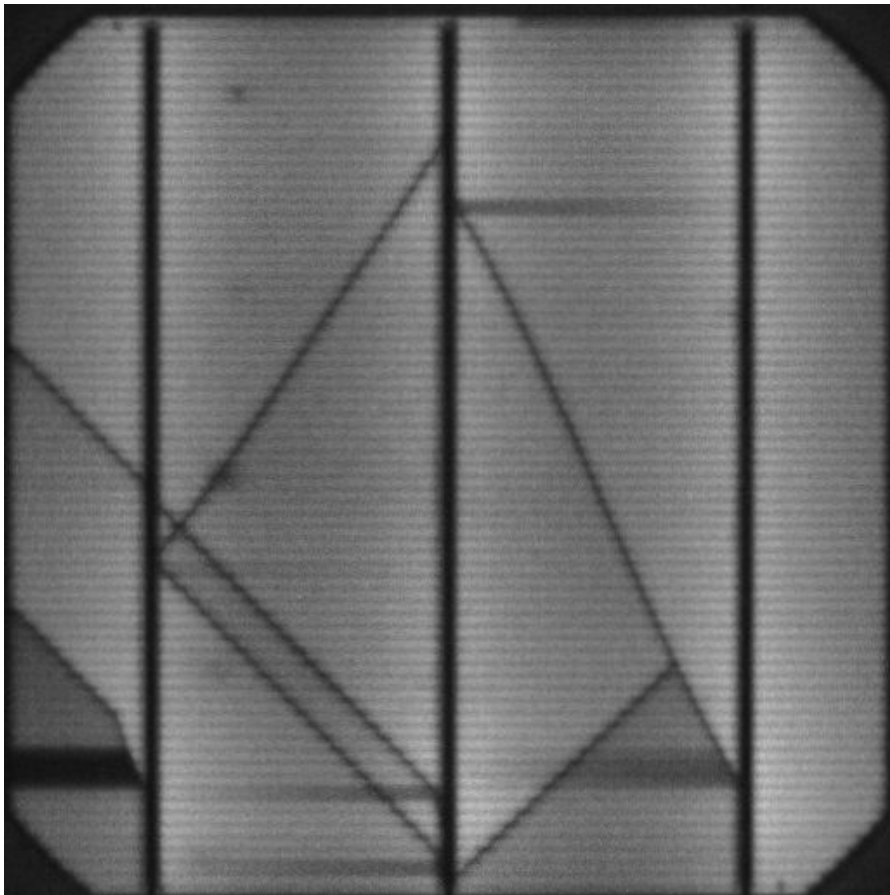
critical: <20% cell area affected
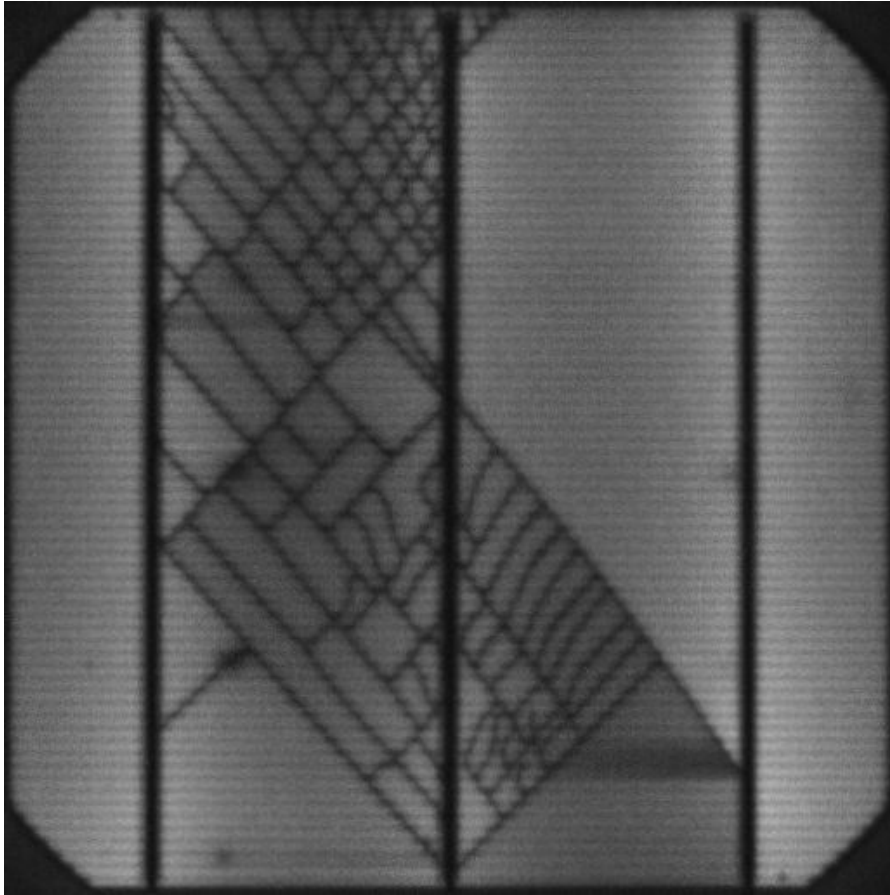
EL Image of Cell (5/7)

very critical: >=20% cell area affected

EL Image of Cell (5/8)
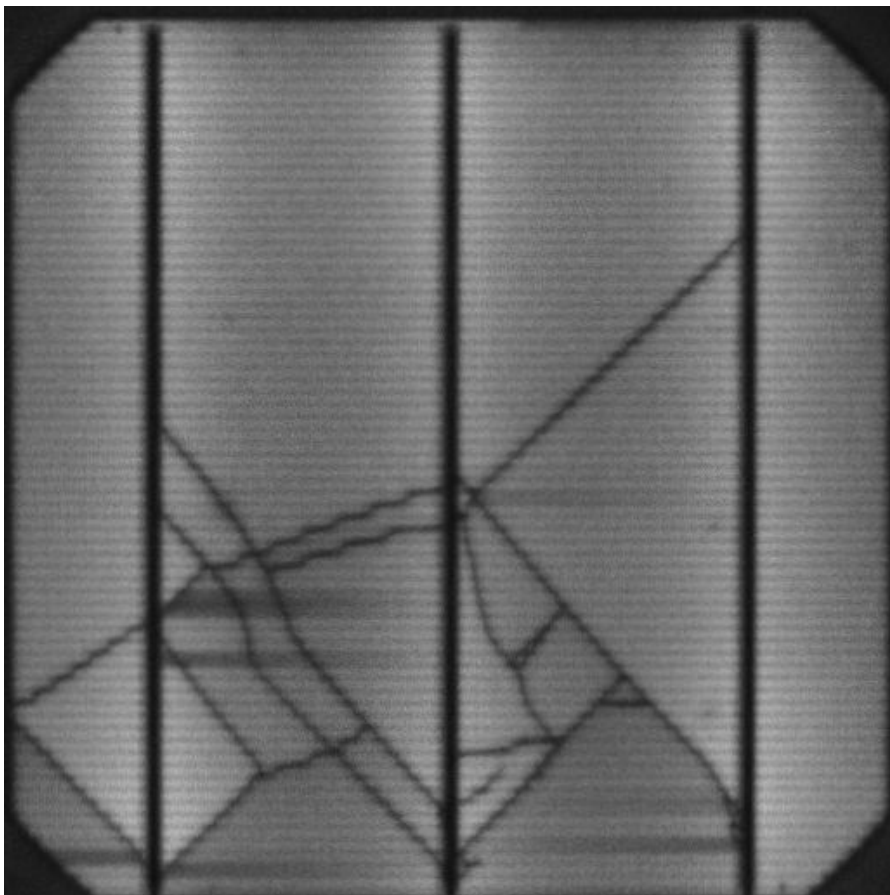
critical: <20% cell area affected
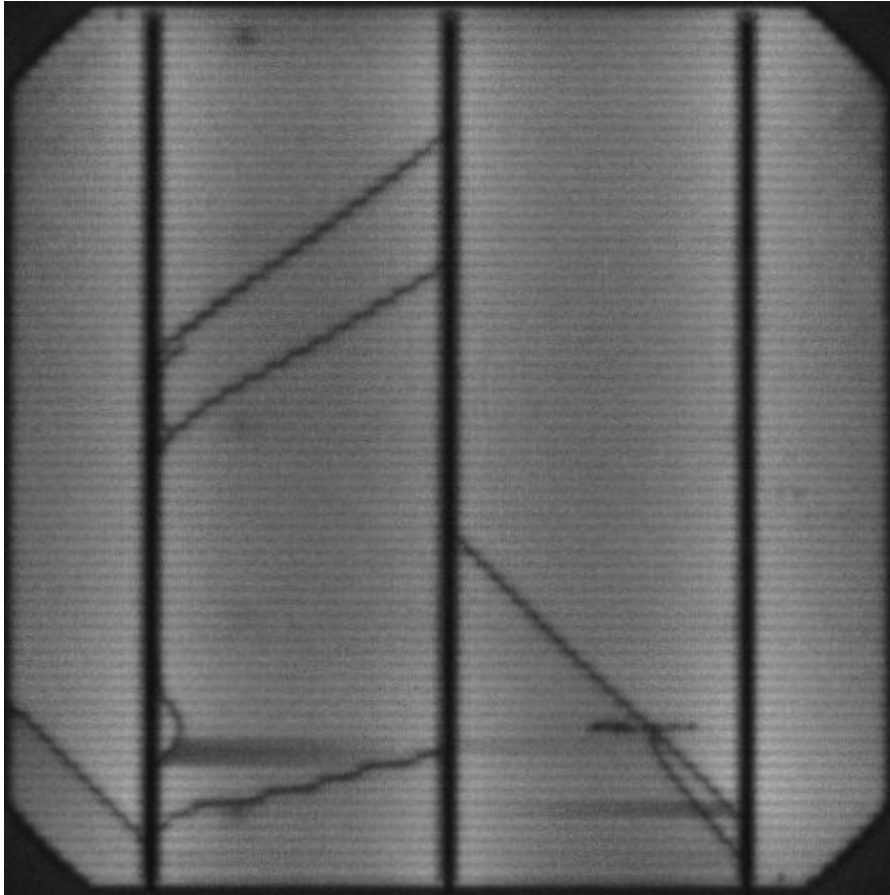
EL Image of Cell (5/9)
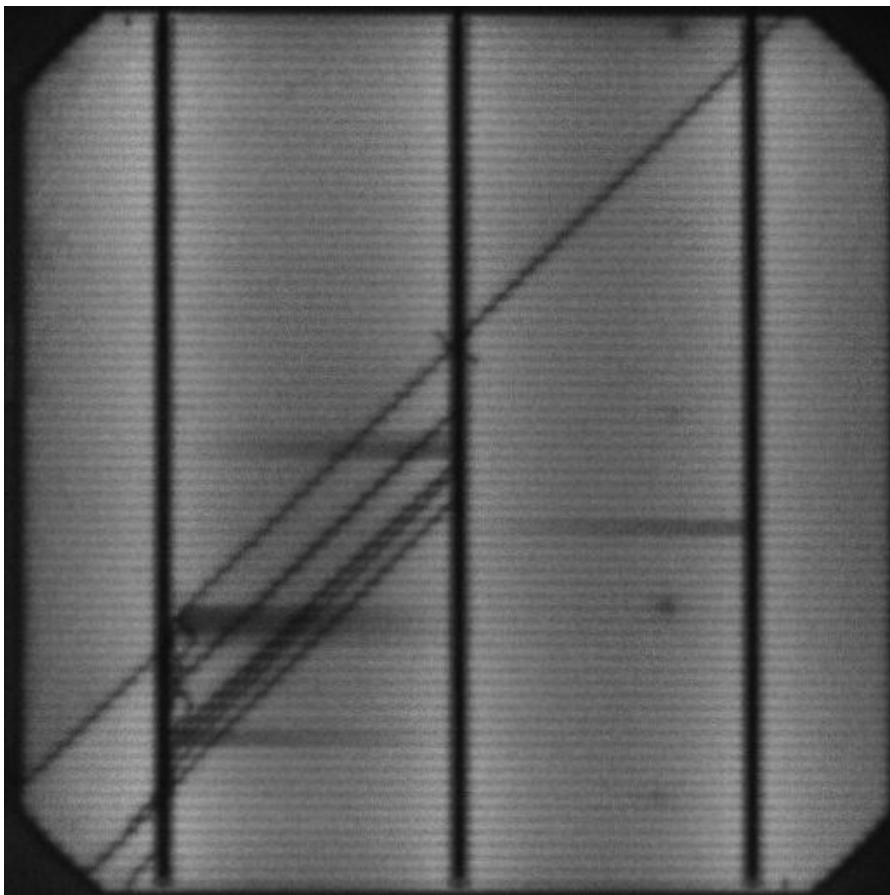

critical: <20% cell area affected

EL Image of Cell (6/1)

critical: <20% cell area affected
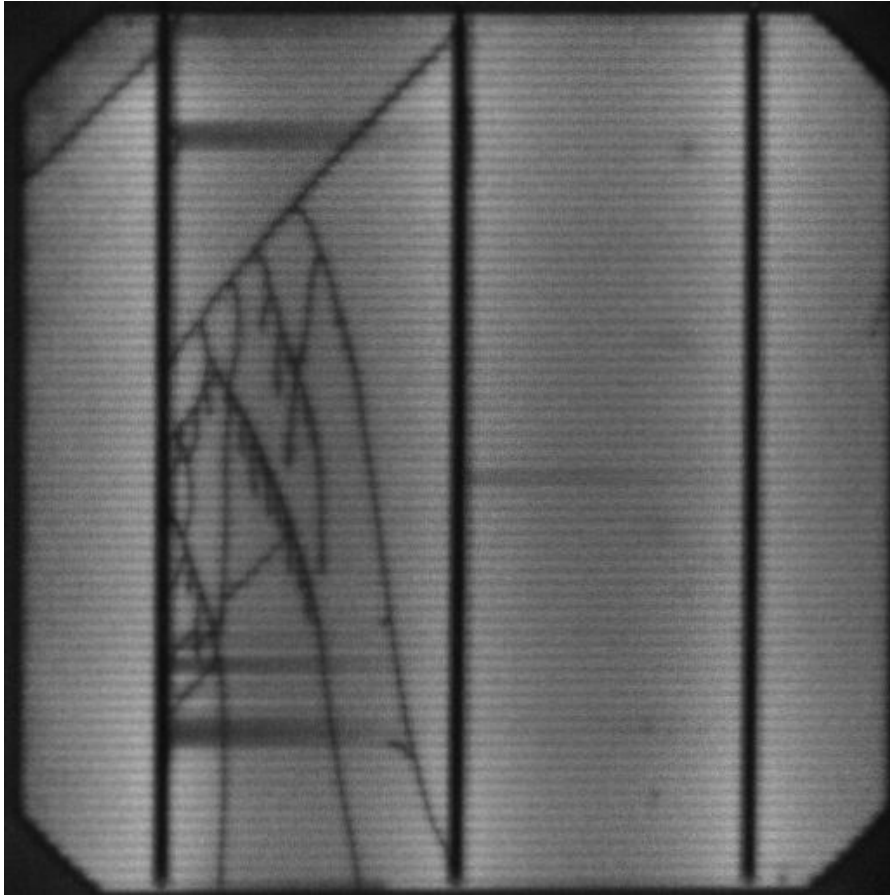
EL Image of Cell (6/2)

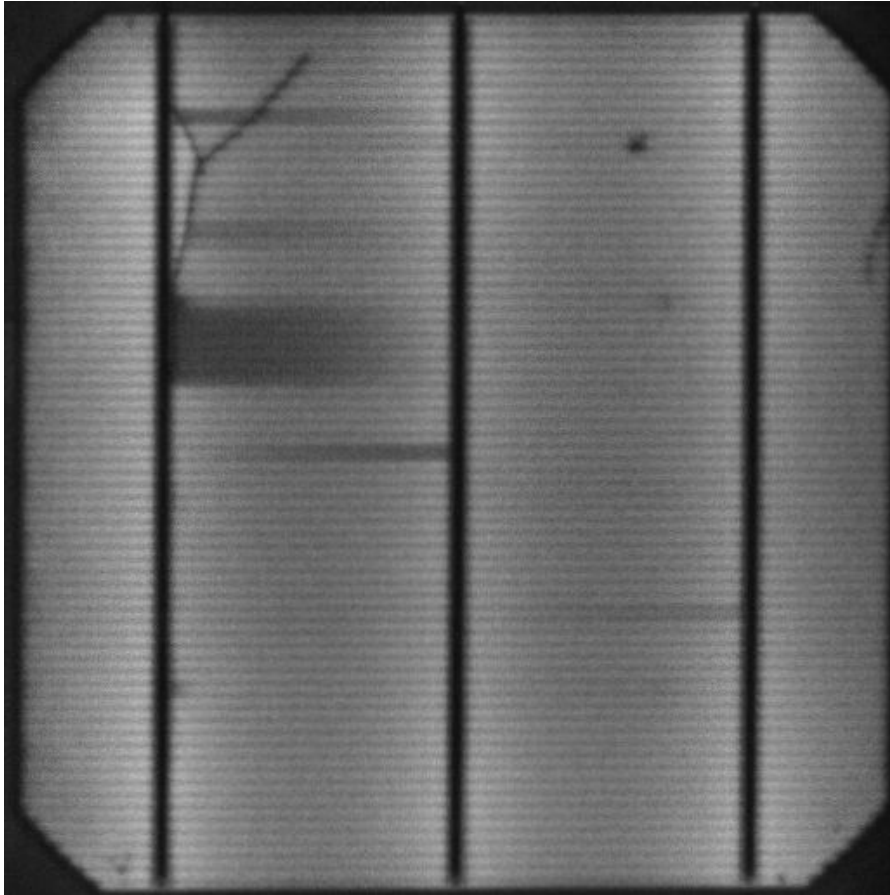

critical: <20% cell area affected

EL Image of Cell (6/3)
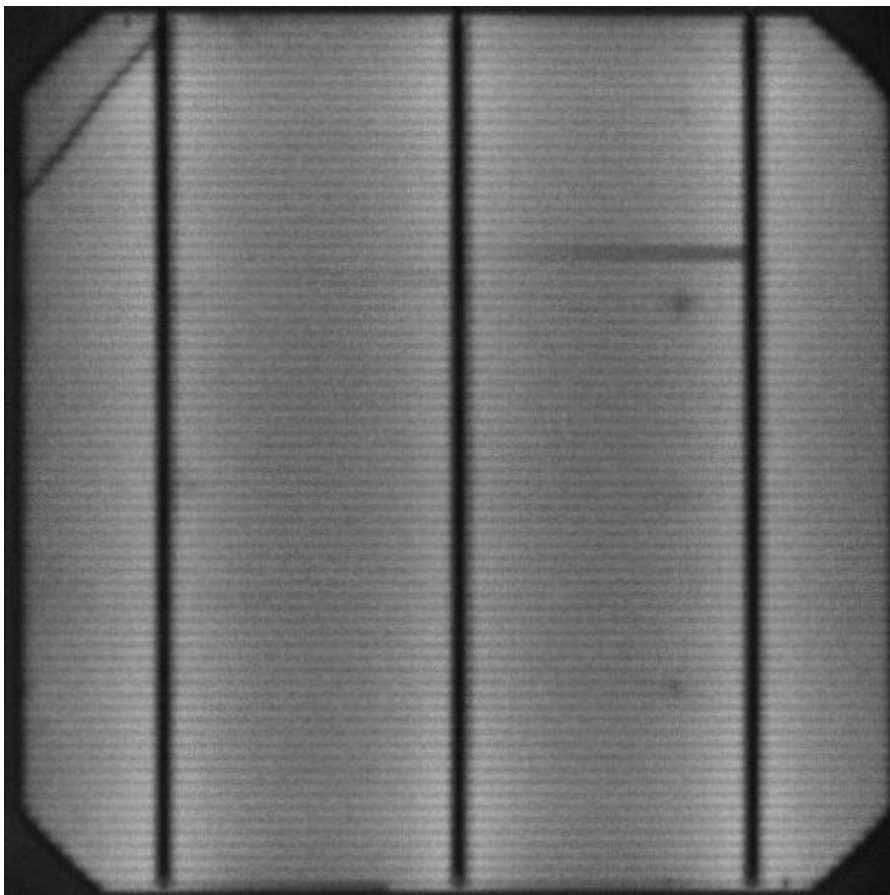
critical: <20% cell area affected

EL Image of Cell (6/4)

critical: <20% cell area affected

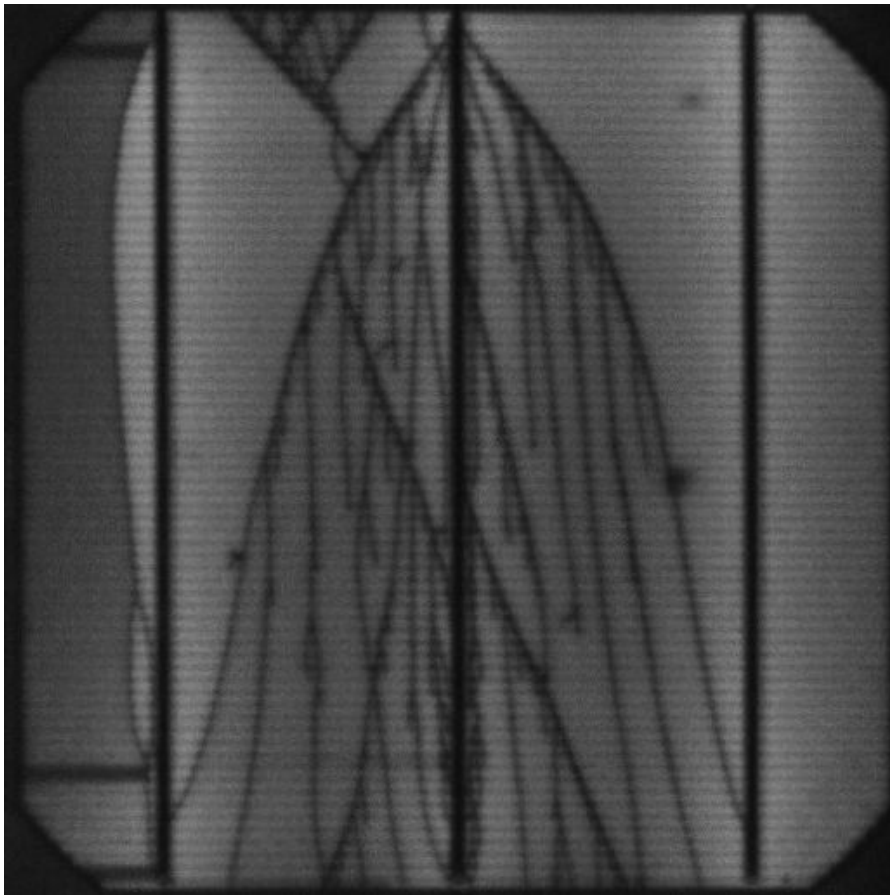EL Image of Cell (6/5)
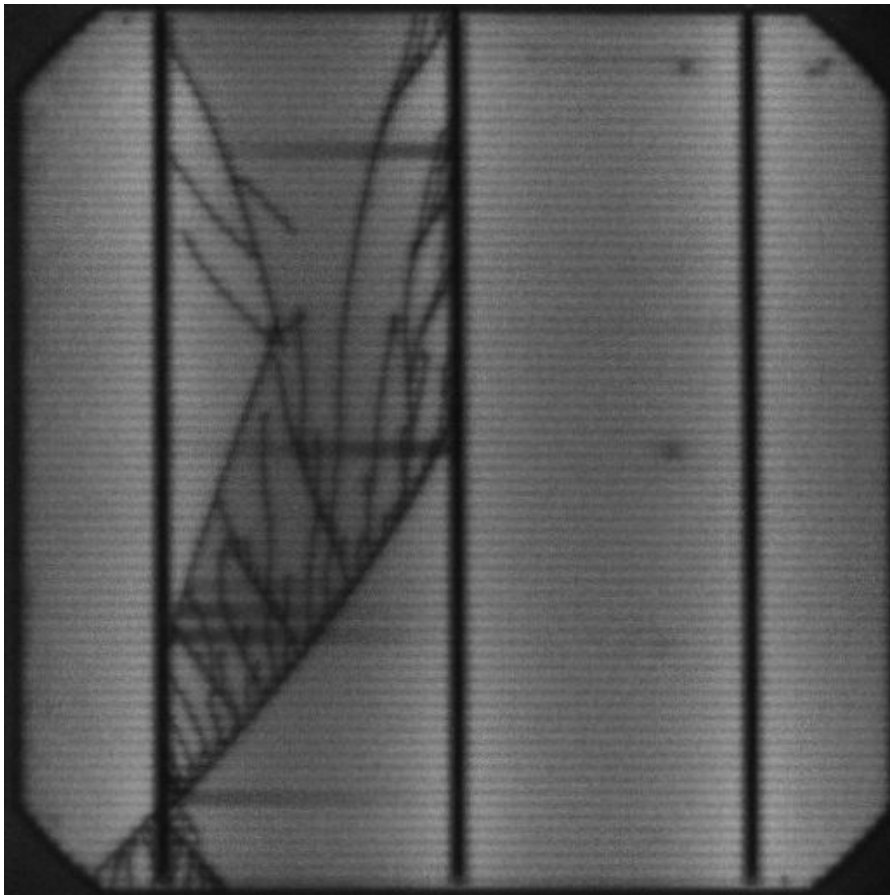
critical: <20% cell area affected
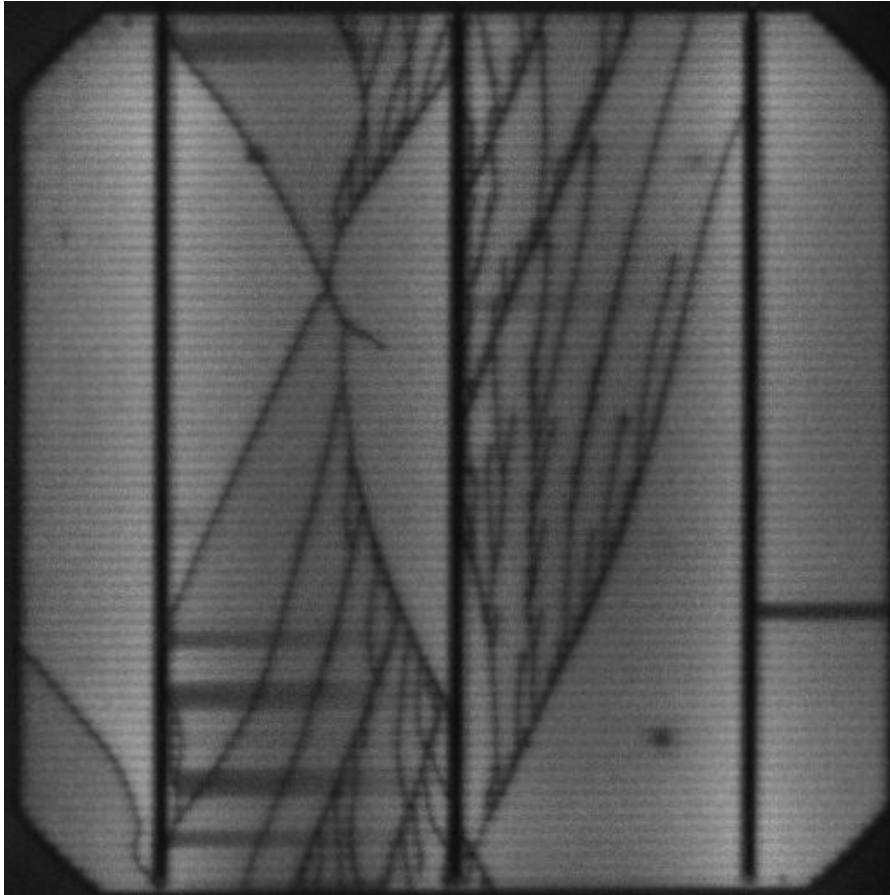
EL Image of Cell (6/6)

very critical: >=20% cell area affected

EL Image of Cell (6/7)

very critical: >=20% cell area affected

Affected Area of Cell (6/7): 53.43%
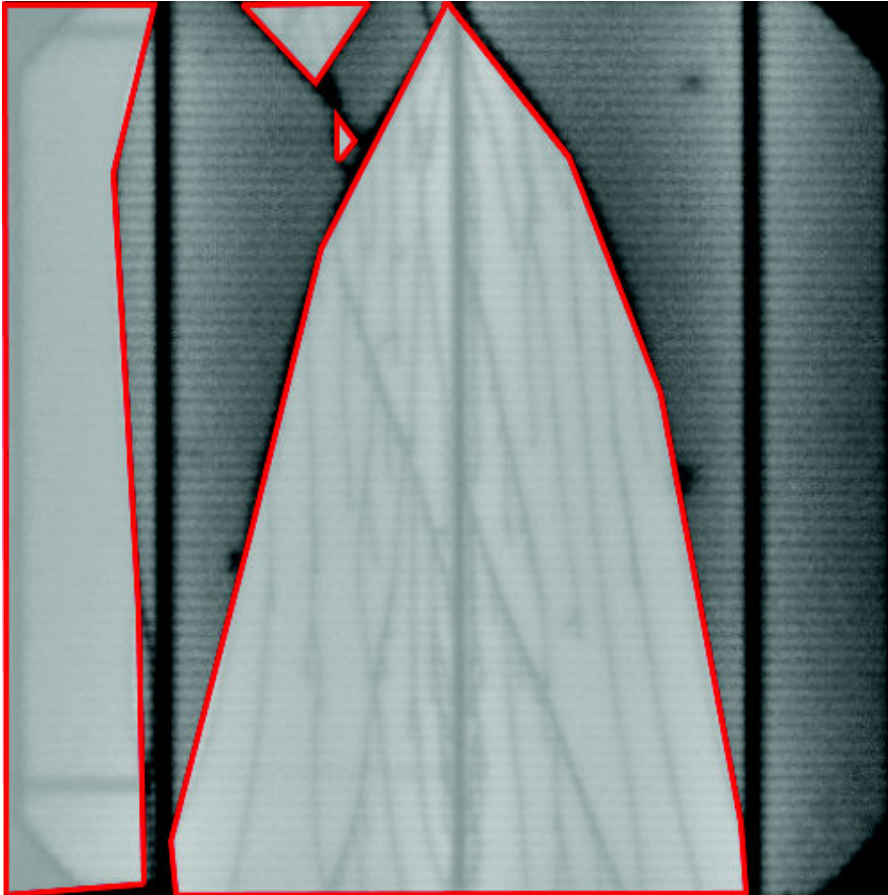
largest affected area

EL Image of Cell (6/8)

critical: <20% cell area affected

EL details for ID20160622083811

EL Image of Cell (6/9)

critical: <20% cell area affected
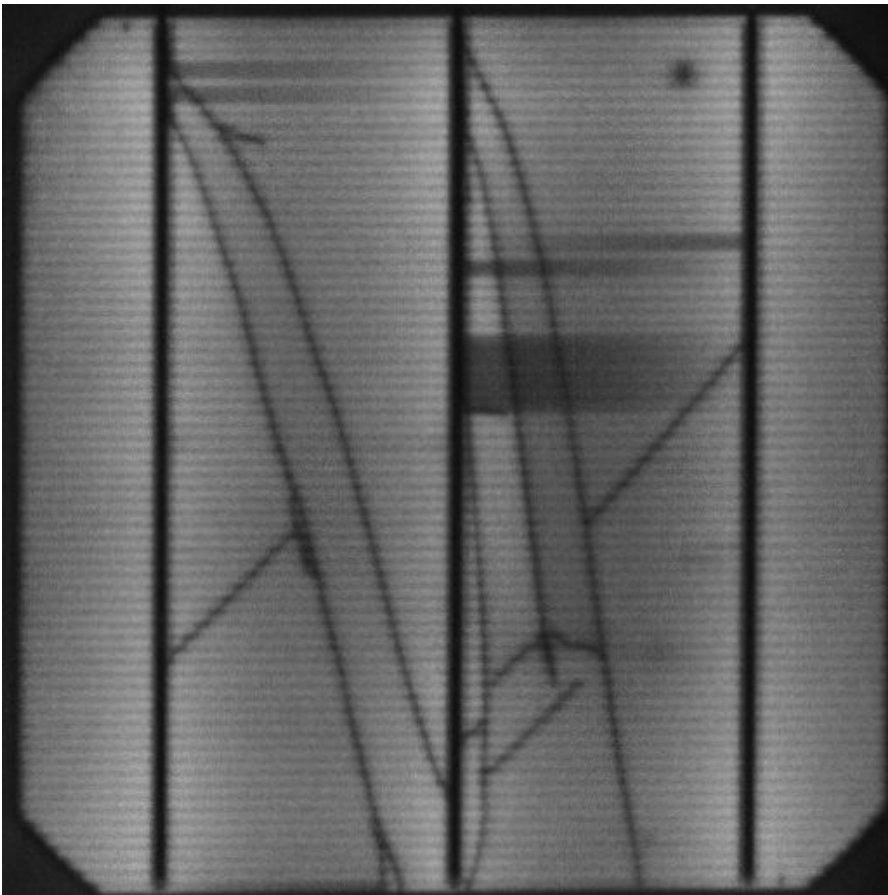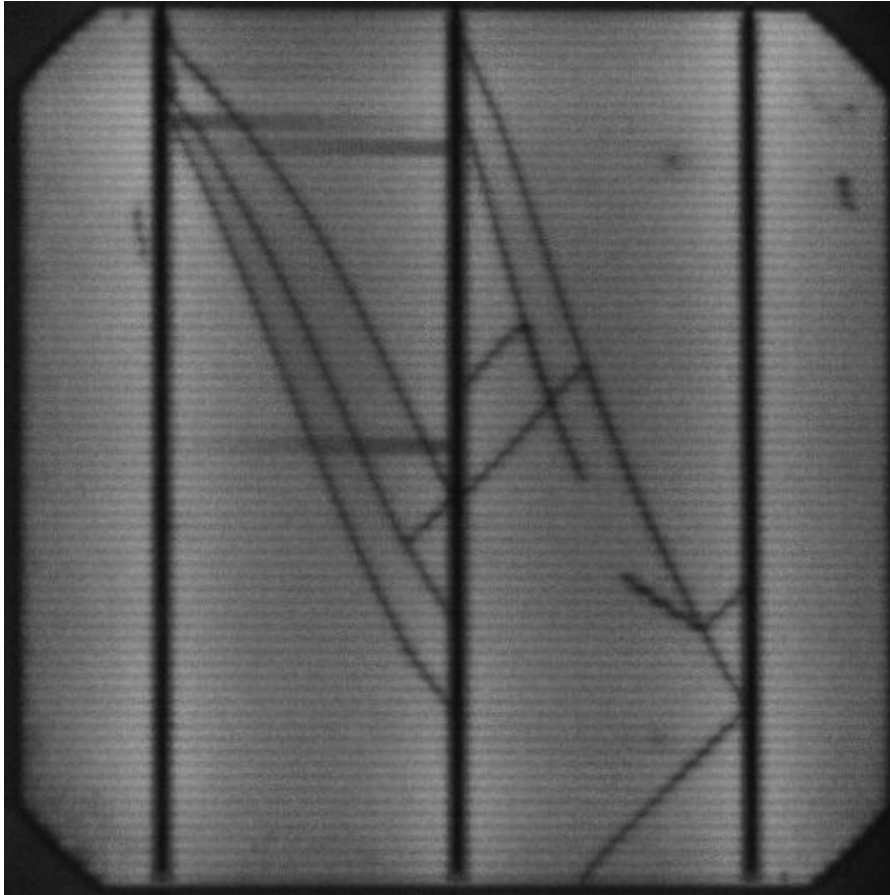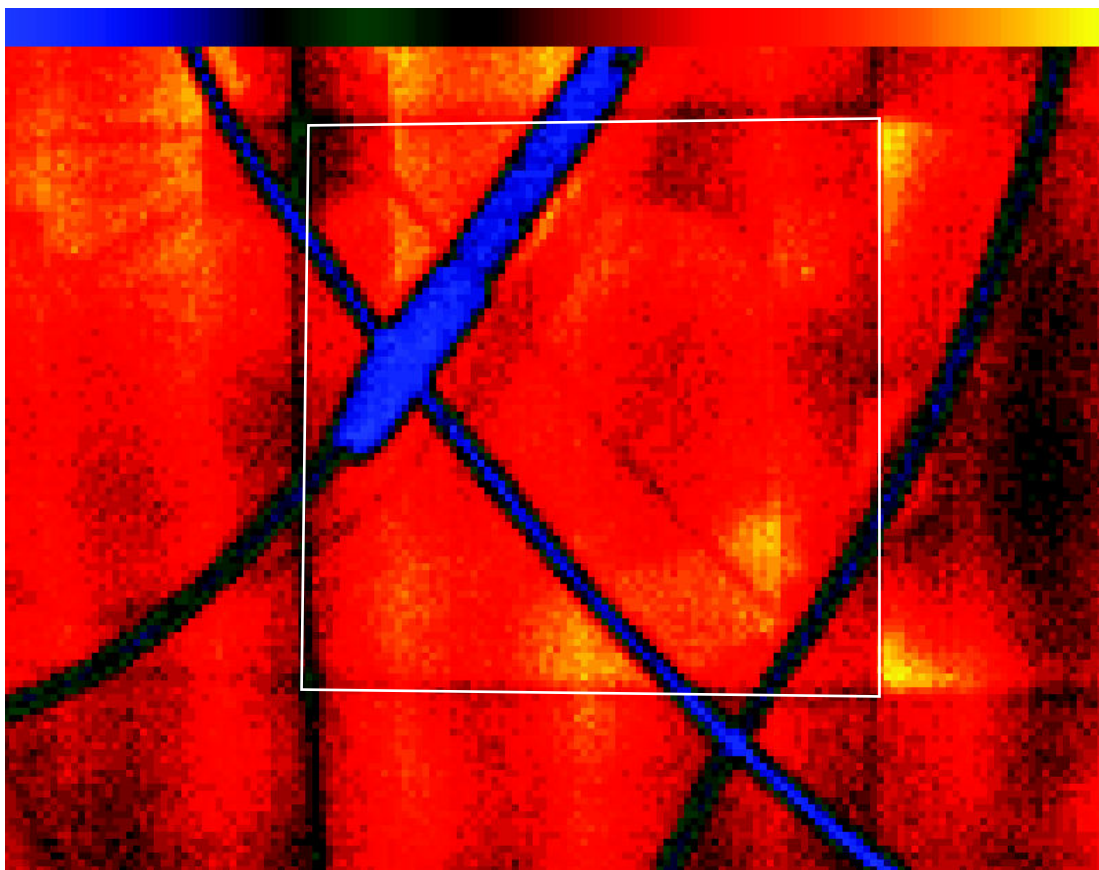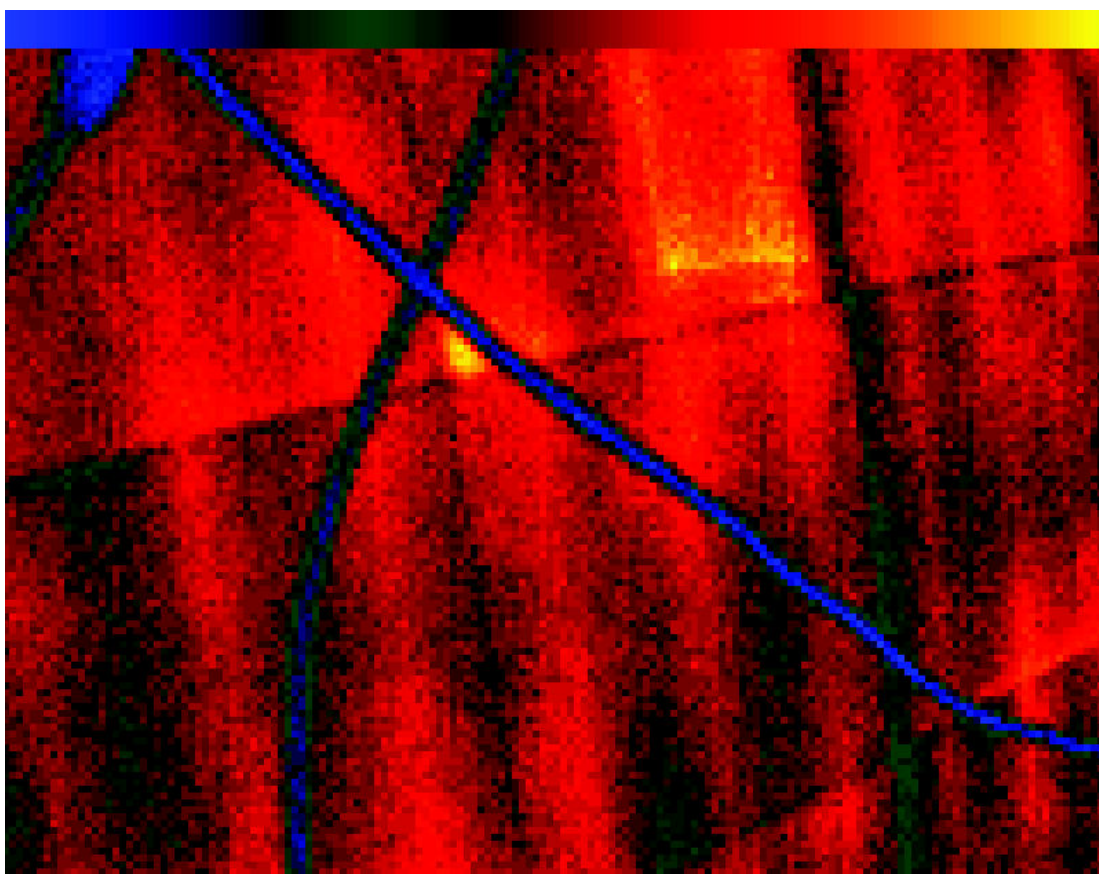
Thermography for ID20160622083811

Palet Low:26.4°C High:30.0°C   Temperature Lowest:26.4°C Highest:29.8°C
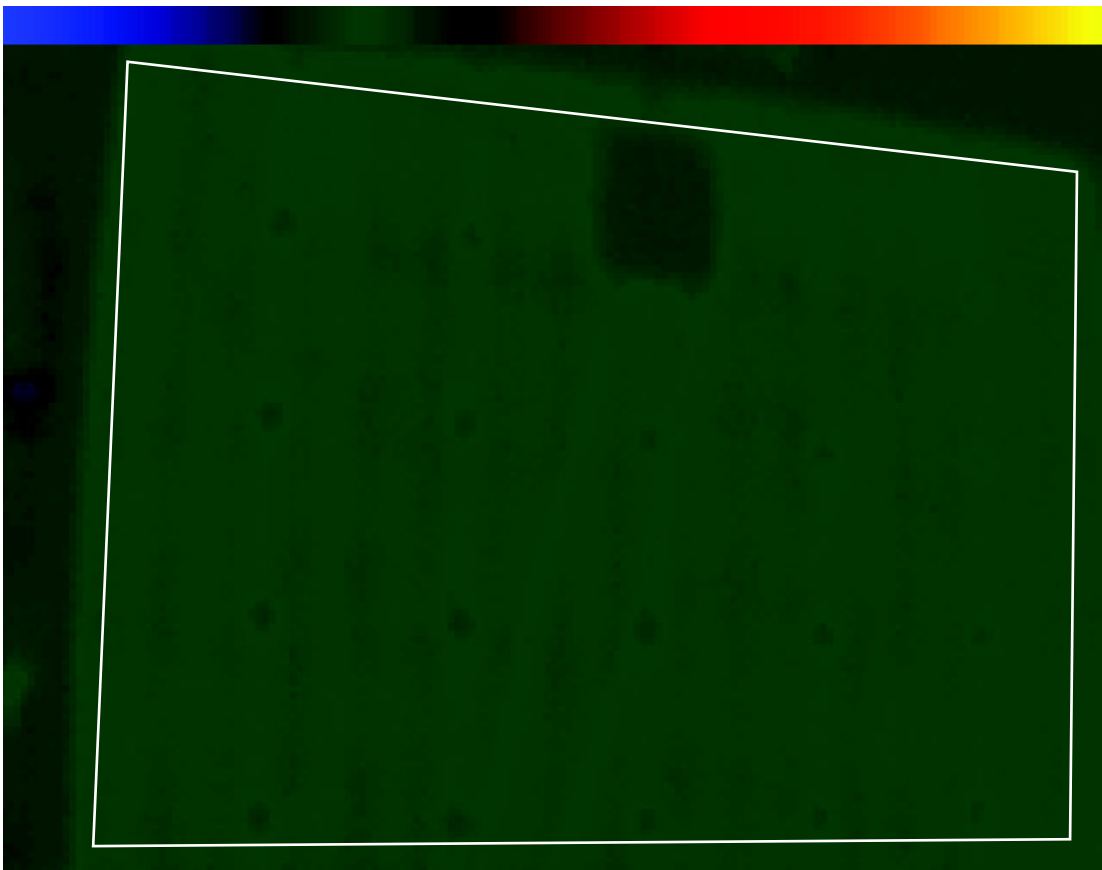I[A]:12.0 U[V]:41.5 t[s]:58   dT[°C]:3.4

Palet Low:26.5°C High:30.3°C
I[A]:12.0 U[V]:41.5 t[s]:52   dT[°C]:3.8

Thermography for ID20160622083811
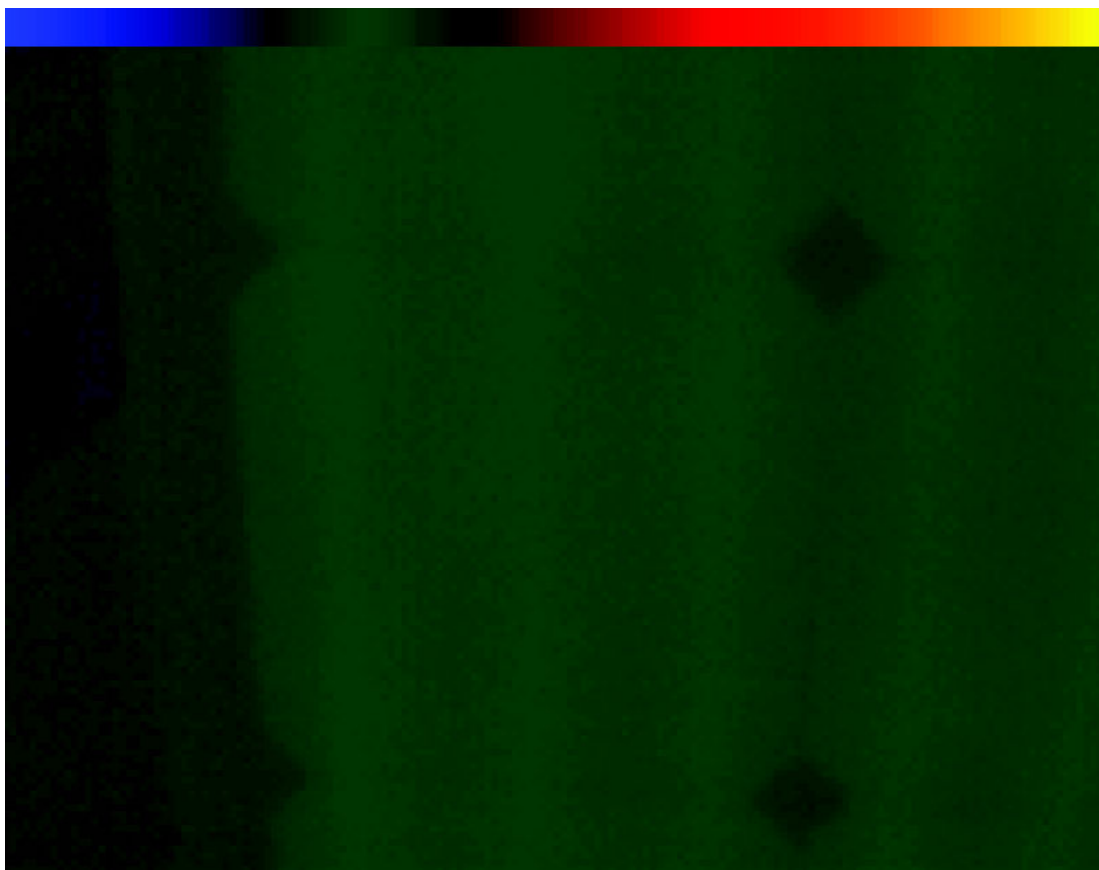

Palet Low:15.0°C High:50.0°C   Temperature Lowest:24.1°C Highest:36.8°C
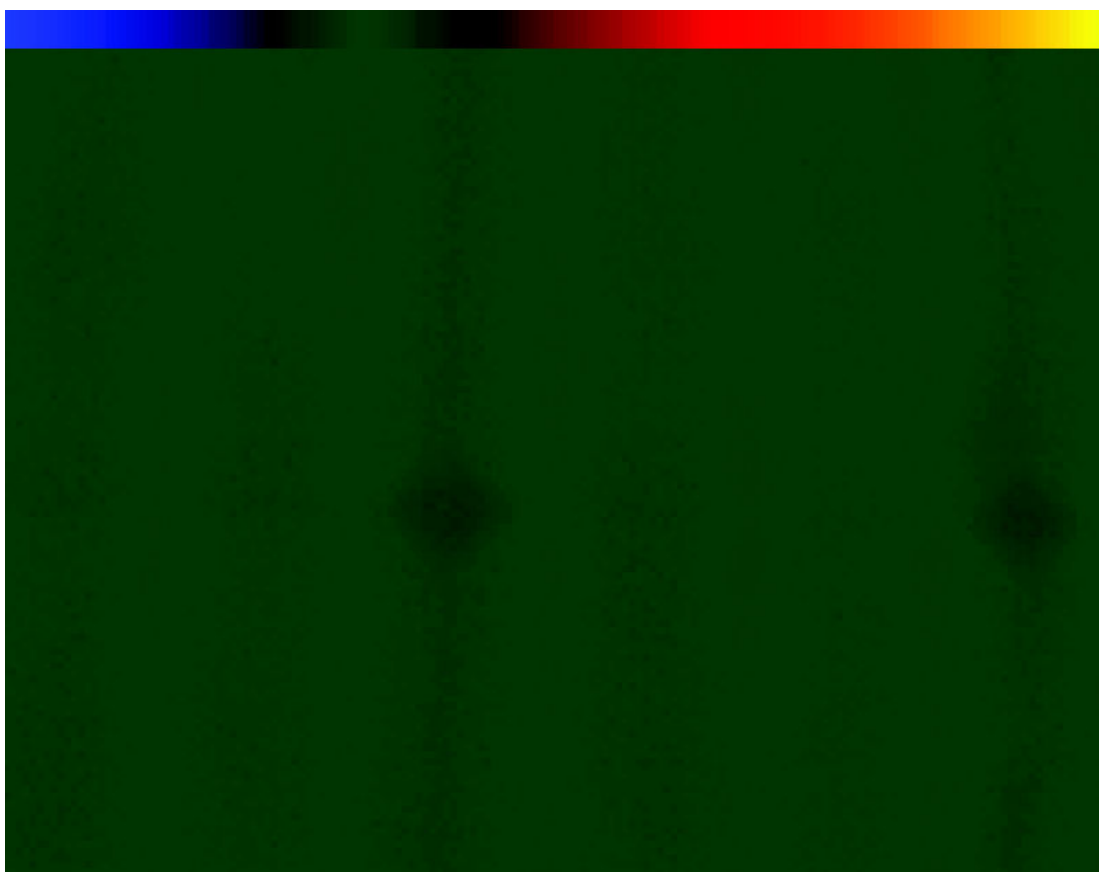I[A]:12.0 U[V]:41.8 t[s]:5   dT[°C]:12.7

Palet Low:15.0°C High:50.0°C   Temperature Lowest:24.6°C Highest:27.5°C
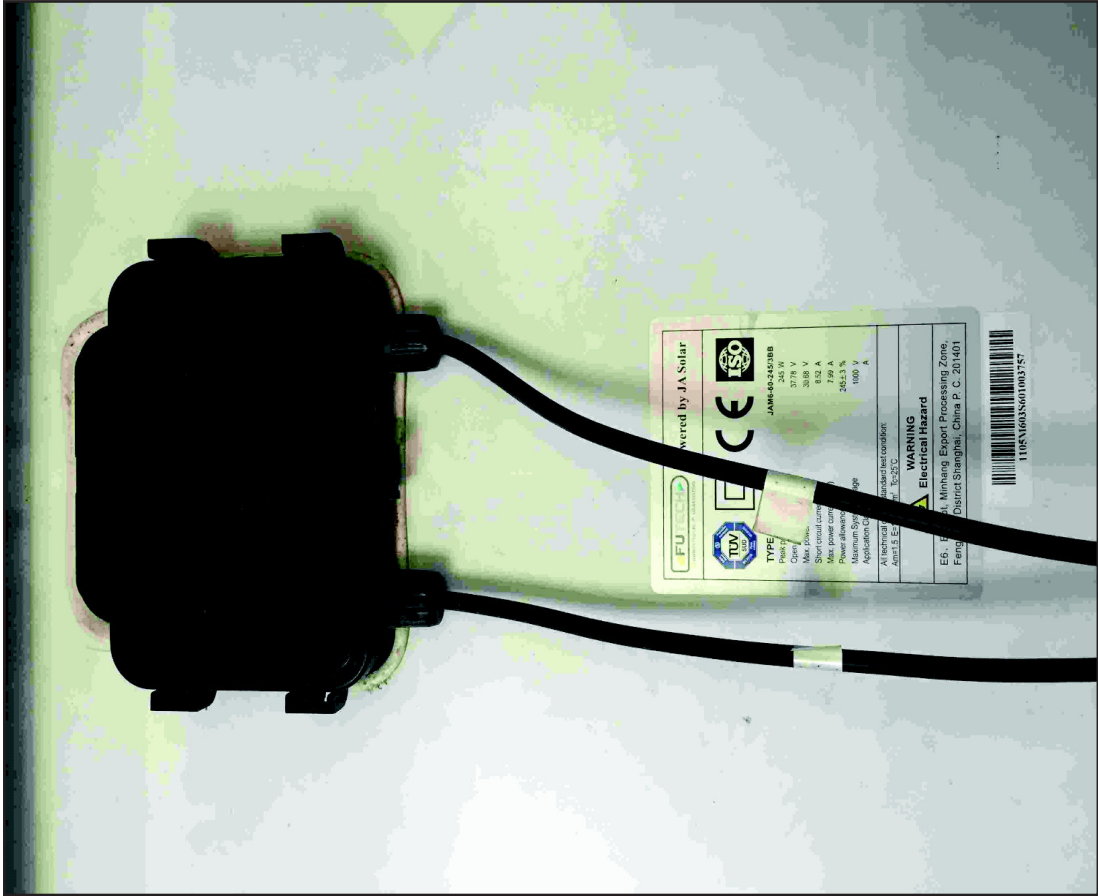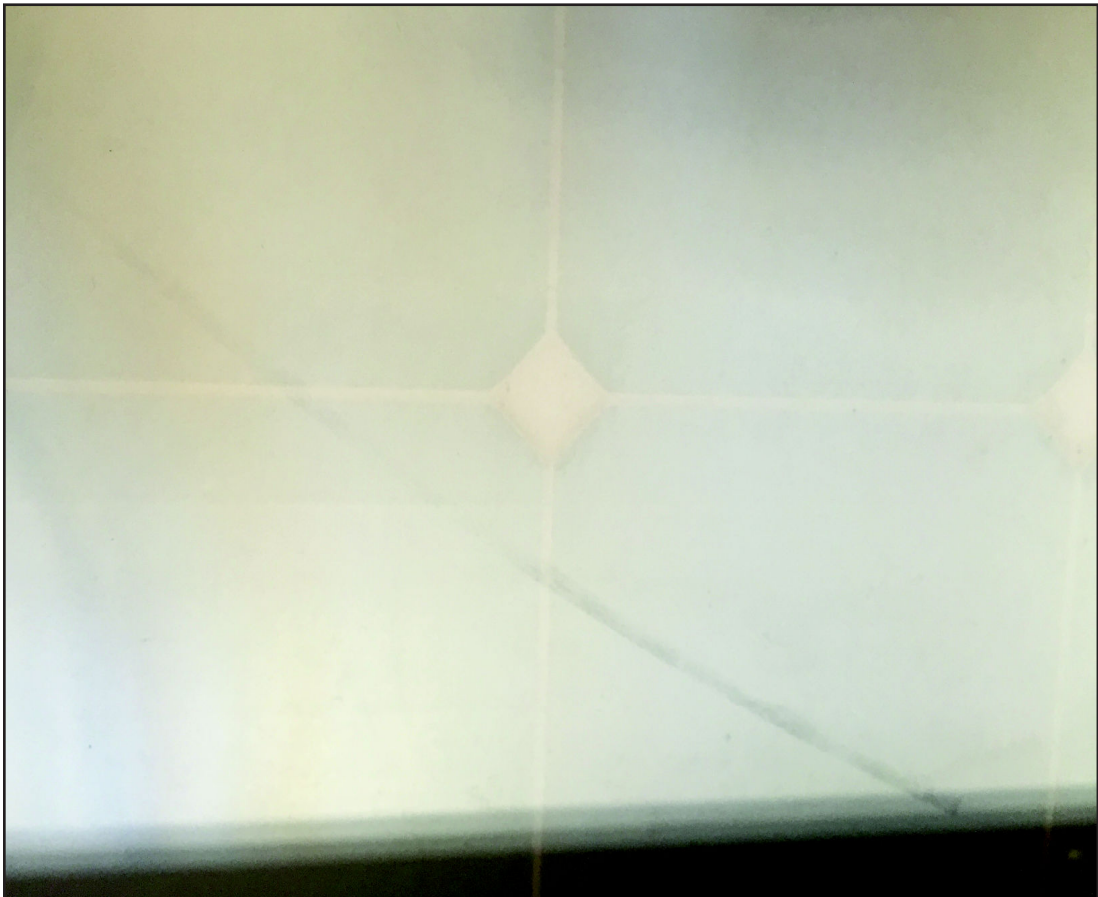I[A]:12.0 U[V]:43.1 t[s]:47   dT[°C]:2.9

Palet Low:15.0°C High:50.0°C   Temperature Lowest:23.0°C Highest:26.7°C
I[A]:12.0 U[V]:43.1 t[s]:24   dT[°C]:3.7

Palet Low:15.0°C High:50.0°C   Temperature Lowest:24.8°C Highest:26.9°C
I[A]:12.0 U[V]:43.5 t[s]:15   dT[°C]:2.1

Connection box
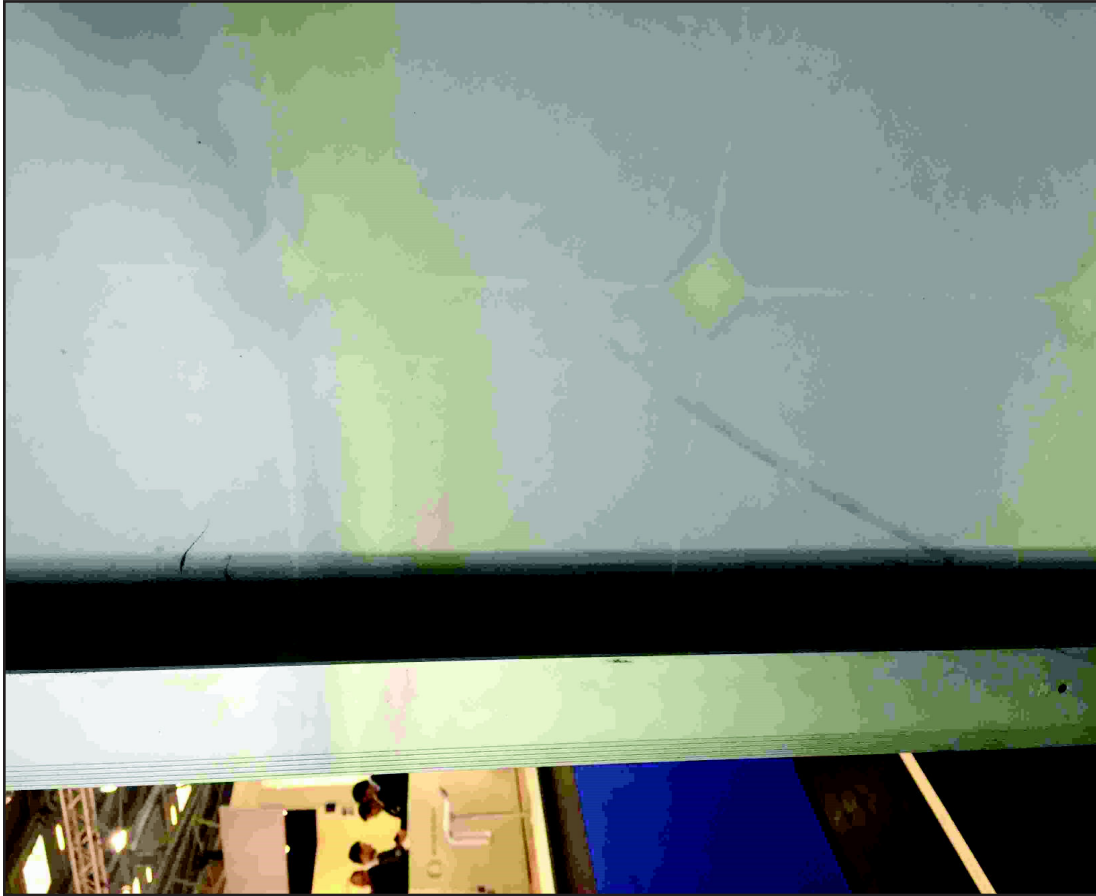

Backside scratch

backsite scratch