Laser-Induced Damage Threshold (LIDT) Measurement Report

ISO 21254-2: S-on-1 Test Procedure

Sample: 2-CPW-ZO-L/2-0343

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Tester/date: E. Pupka / 2014-12-19

Specimen

Name of sample: 2-CPW-ZO-L/2-0343

Type of specimen: Crystal, AR Coating

Storage, cleaning: Plastic box, dust blow off by compressed air

Test specification

Third harmonic of pulsed Nd:YAG InnoLas Laser: SpitLight Hybrid laser (λ = 355 nm, linear polarization, pulse duration 6 ns), $\lambda/2$ plate combined with additional polarizer attenuator, online scattered light damage detection, offline inspection of damage detection using Nomarski microscopy (100x).

Laser parameters

Wavelength:	355 nm
Angle of incidence:	0 deg.
Polarization state:	linear
Pulse repetition frequency:	100 Hz
Spatial beam profile in target plane:	TEM_{00}
Longitudinal beam profile:	Single mode (SLM)
Beam diameter in target plane$_{(1/e^2)}$:	180.5 µm (average from 64 pulses)
Pulse duration:	6 ns

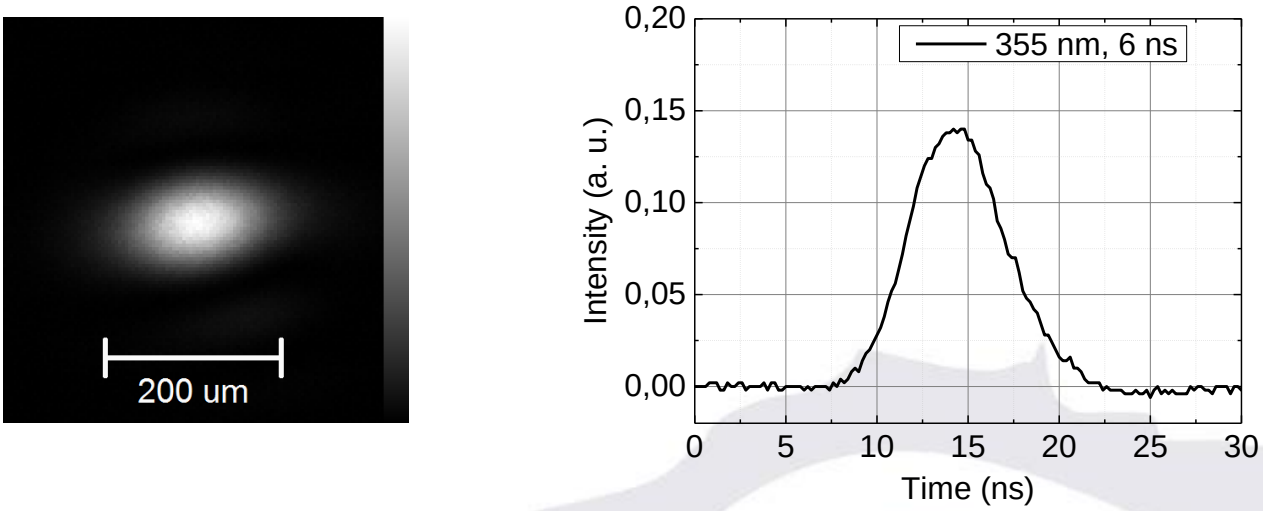

Fig. 1 Spatial beam profile in target plane (left) and oscilloscope trace (right)

Test procedure:	**S-on-1 test**
Number of sites per specimen:	418
Arrangement of test sites:	Equally spaced
Minimum distance between sites:	720 μm
Damage detection:	Scattered light diode
Storage of the specimen:	Plastic box
Test environment:	Industrial environment
Cleaning:	Compressed air
Definition of LIDT:	Nonlinear fit to 0% of damage probability

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Test result:

Table 1 Summarized LIDT's for 2-CPW-ZO-L/2-0343

Test mode	Threshold, J/cm2
1-on-1	12.63 ≤ 16.43 ≤ 19.84
1000-on-1	12.05 ≤ 14.73 ≤ 17.26

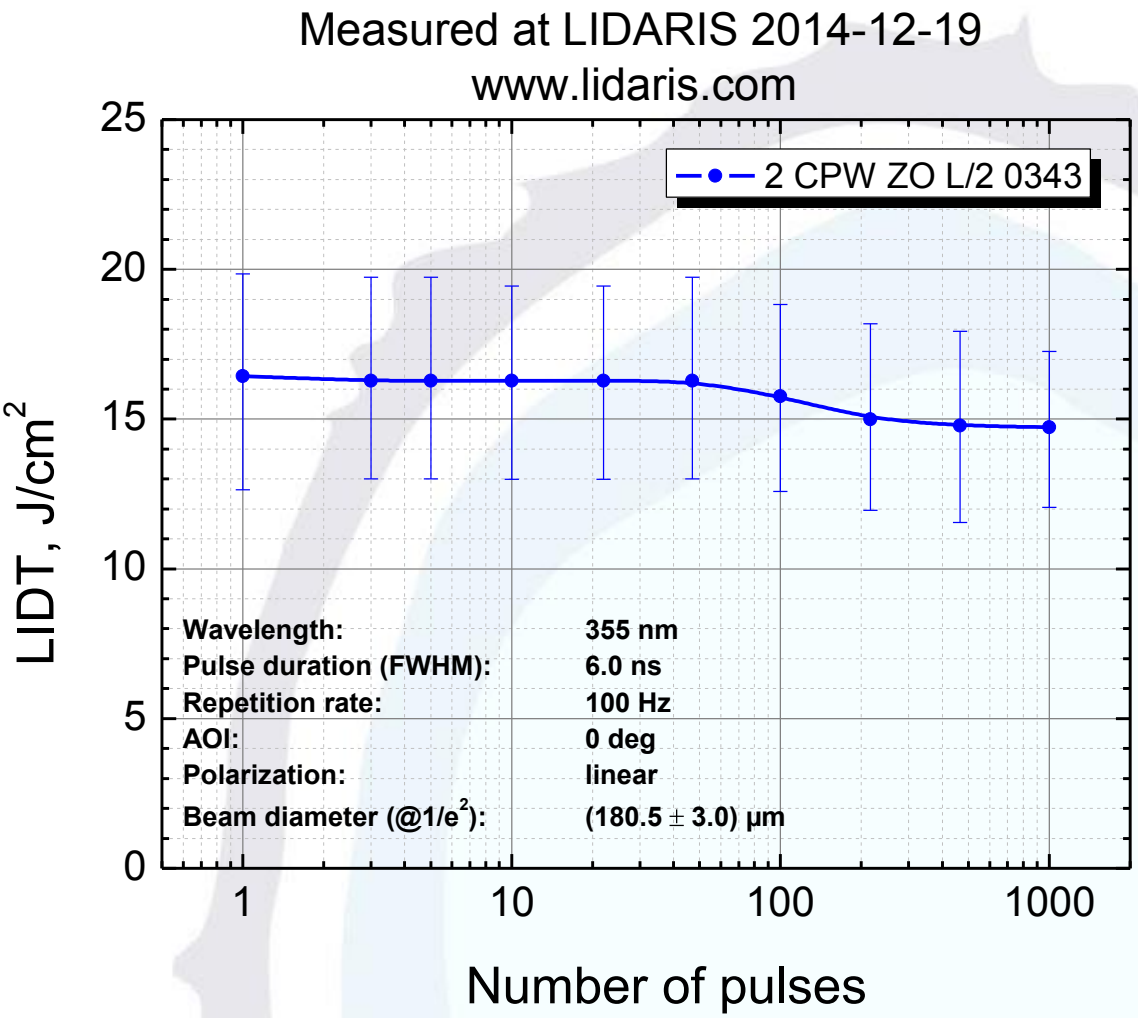

Fig. 2 Characteristic damage curve.

Typical damage morphology:

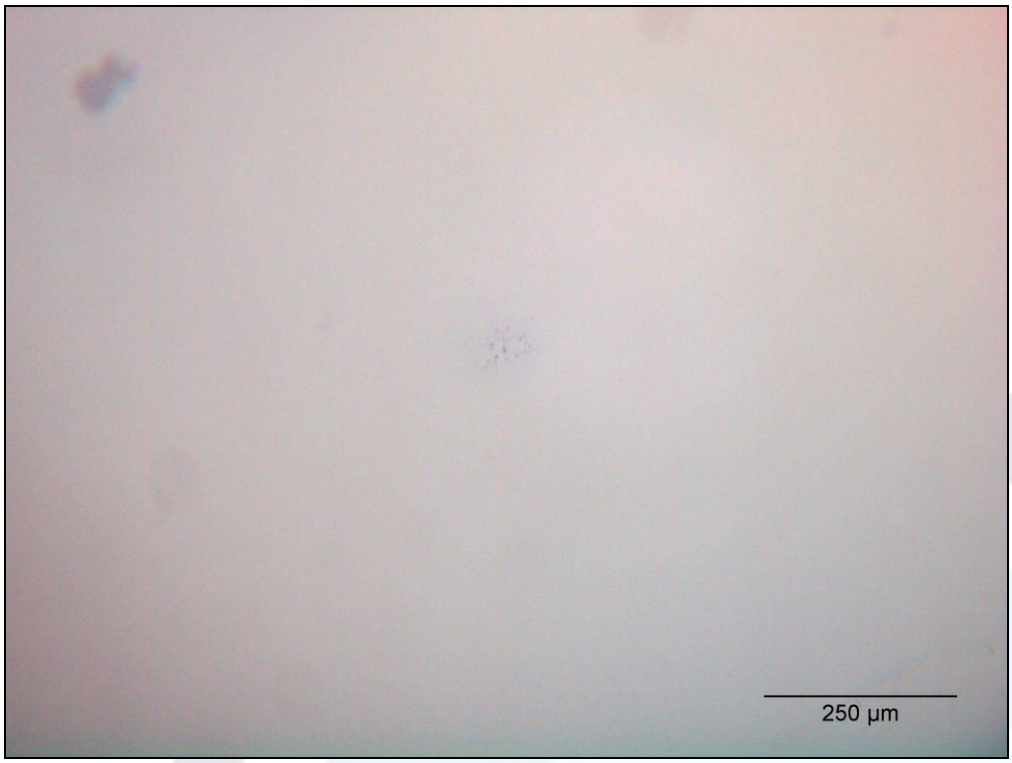

Fig. 3 Typical front surface damage morphology
(Energy density 24.34 J/cm^2, damage after 1 pulse)

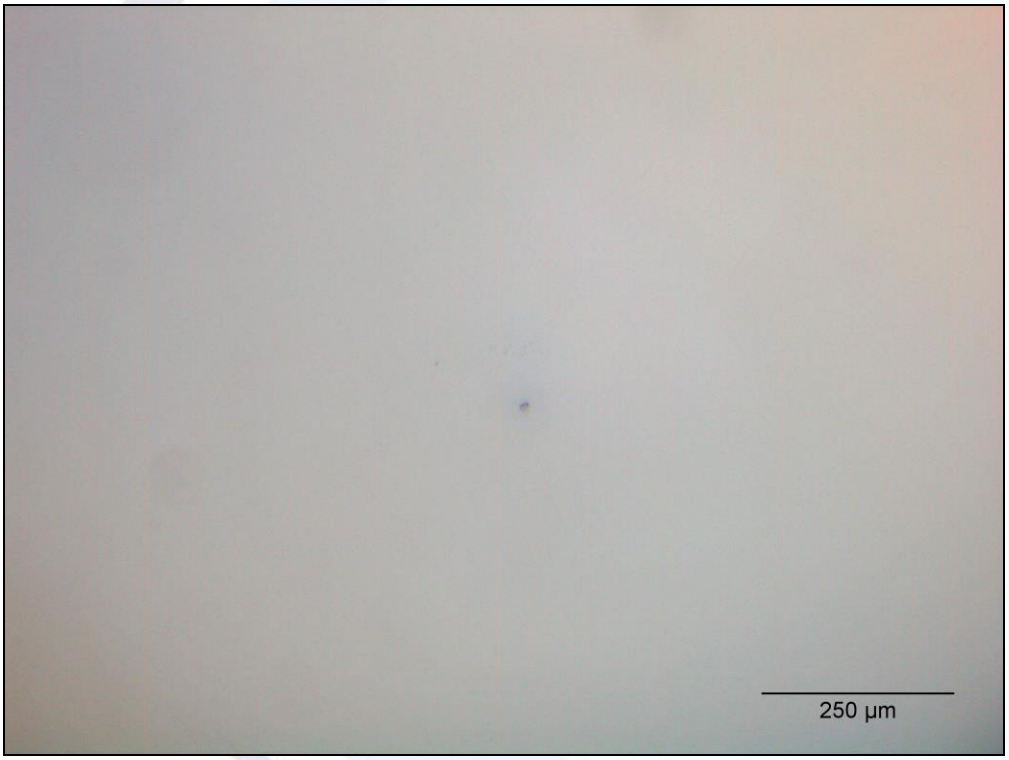

Fig. 4 Typical in volume damage morphology
(Energy density 19.97 J/cm^2, damage after 263 pulses)