

Laser-Induced Damage Threshold (LIDT) Measurement Report

ISO21254-2: S-on-1 Test Procedure

Sample: R14006-12

Request from:

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Tester/date:

E. Pupka / 2015-06-09

Specimen

Name of sample:

R14006-12

Type of specimen:

Yb:YAG, uncoated

Storage, cleaning:

Plastic box, wrapped in paper for optics

Test specification

First harmonic of pulsed Nd:YAG InnoLas Laser: SpitLight Hybrid laser ($\lambda = 1064$ nm, linear polarization, pulse duration 10.2 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 used for testing

Wavelength:	1064 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/e²) :	250.0 ± 5.4 μm (average from 64 pulses)
Pulse duration:	10.2 ns

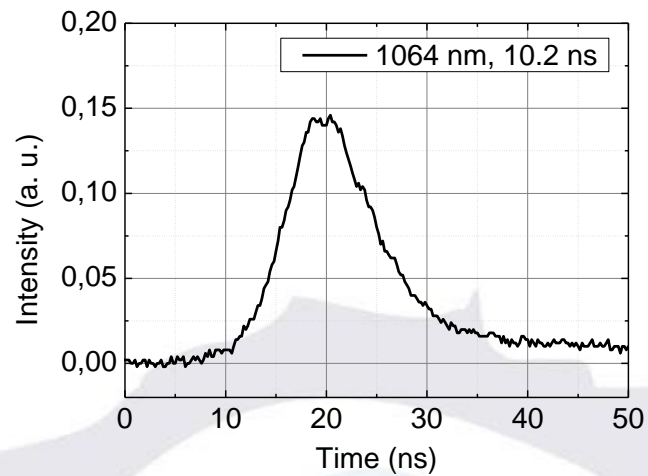
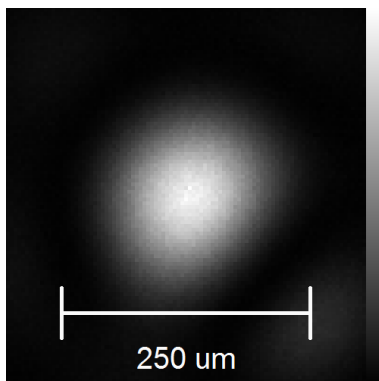


Fig. 1. Spatial beam profile in target plane (left) and oscilloscope curve (right).

Test procedure:

Number of sites per specimen:

Arrangement of test sites:

Minimum distance between sites:

Damage detection:

Storage of the specimen:

Test environment:

Cleaning:

Definition of LIDT:

S-on-1 test

203

equally spaced

875 μm

Scattered light diode

Manufacturer's packaging,
normal laboratory conditions

Industrial environment

Dust blown off with clean air

Nonlinear fit to 0% of damage Probability

Test result:

Table 1. Summarized LIDT's for sample R14006-12.

Test mode	Threshold - front surface, J/cm ²	Threshold - rear surface, J/cm ²
10-on-1	15.98 ≤ 19.15 ≤ 22.14	19.36 ≤ 22.77 ≤ 25.96
1000-on-1	11.40 ≤ 13.66 ≤ 15.73	9.98 ≤ 11.94 ≤ 13.61

Measured at LIDARIS 2015-06-09

www.lidarisis.com

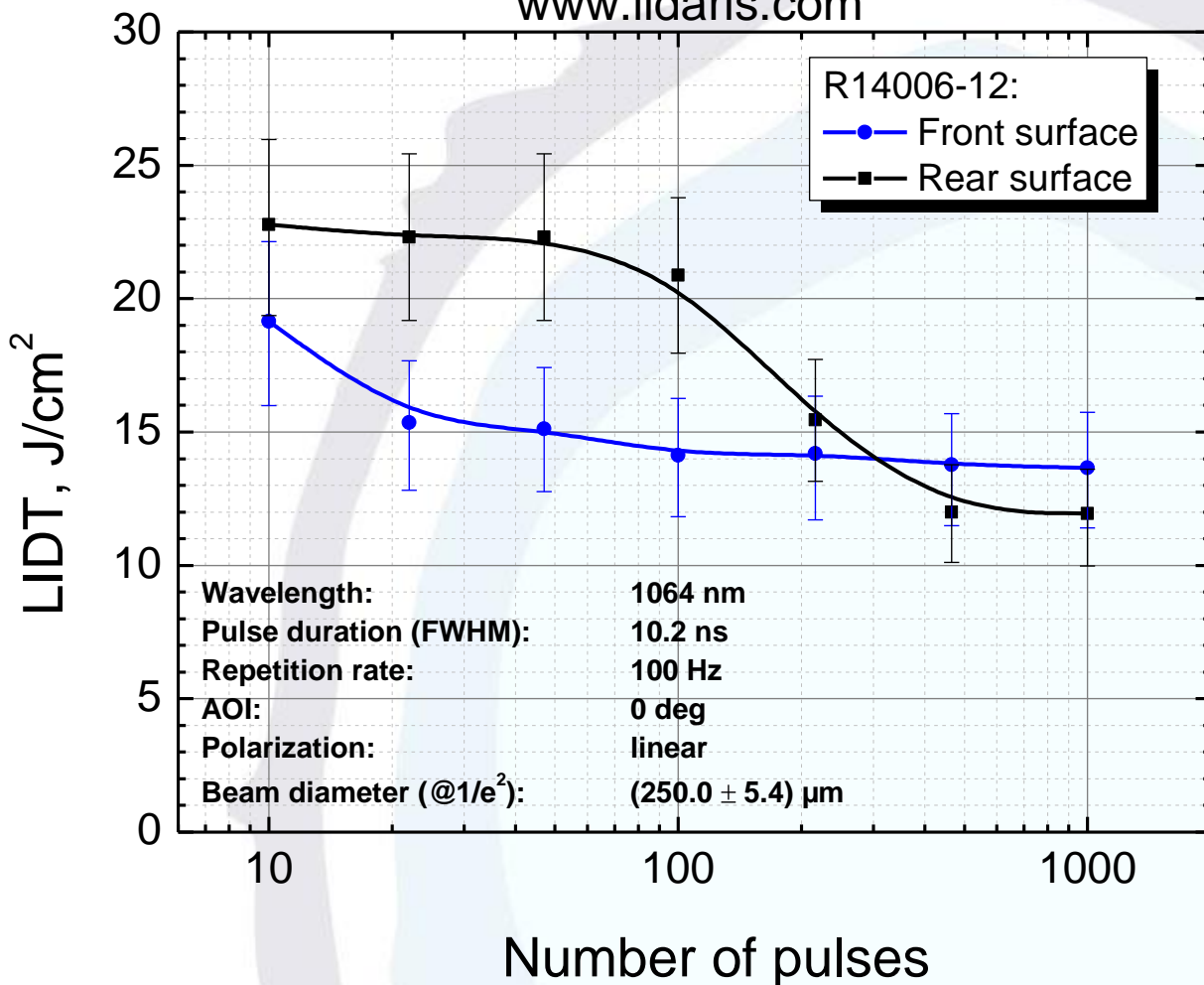
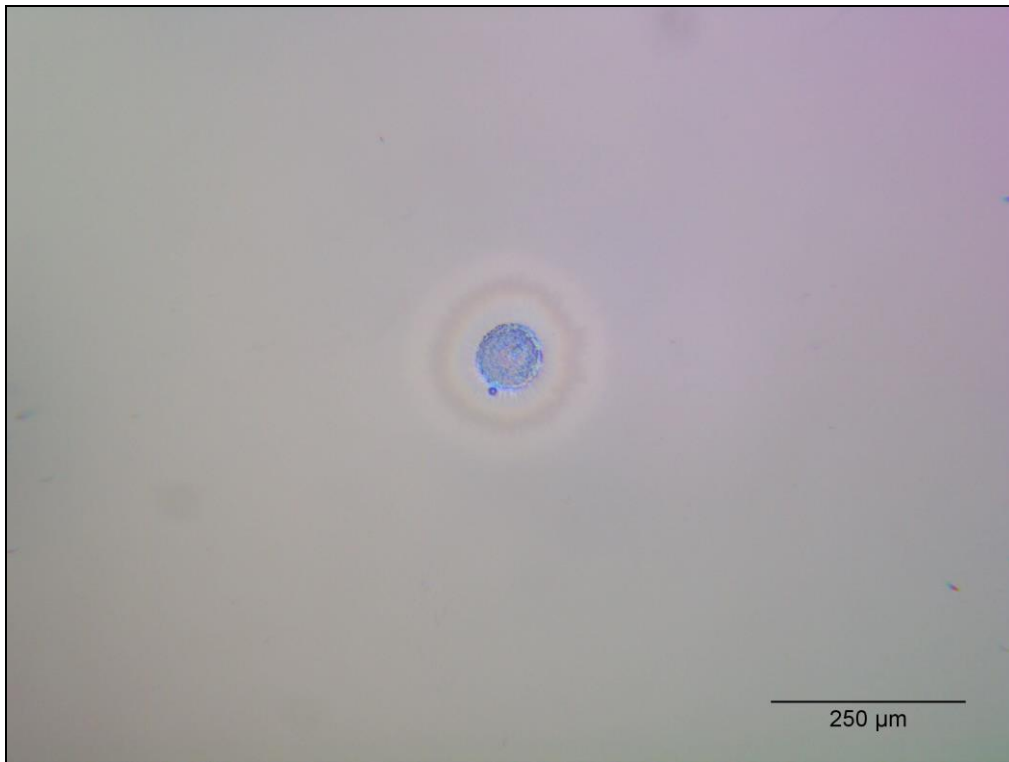
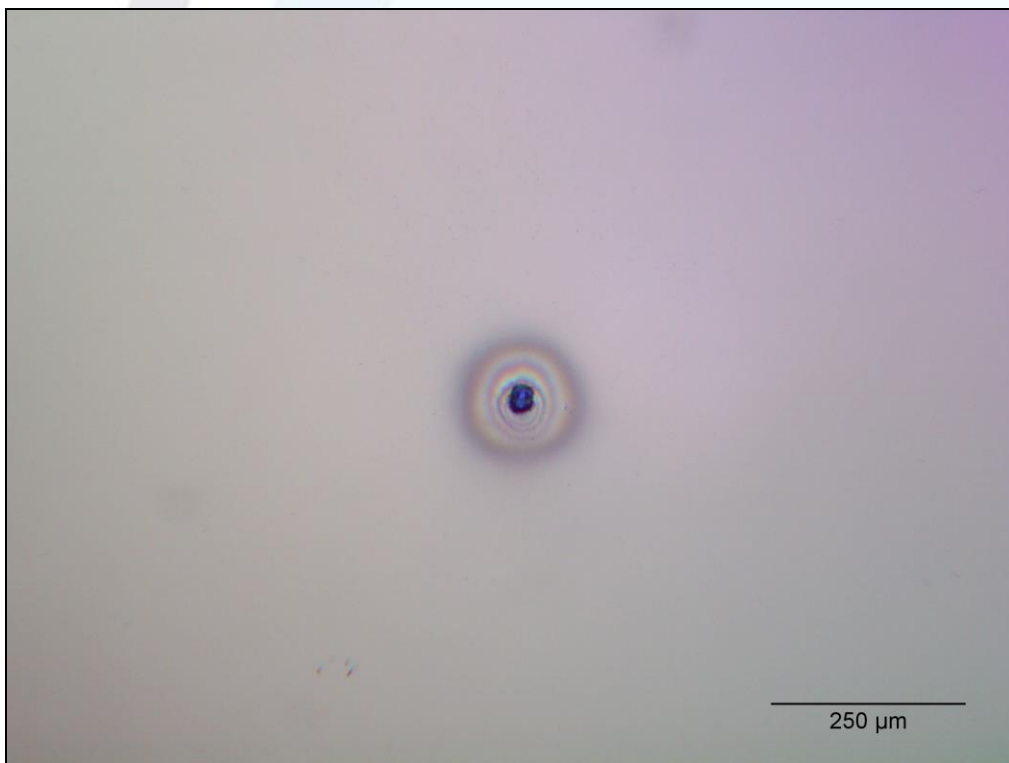


Fig. 2. Characteristic damage curve.

Typical damage morphology:



**Fig. 3. Typical front surface damage morphology
(Energy density 30.42 J/cm², damage after 11 pulses)**



**Fig. 4. Typical front surface damage morphology
(Energy density 15.06 J/cm², damage after 602 pulses)**

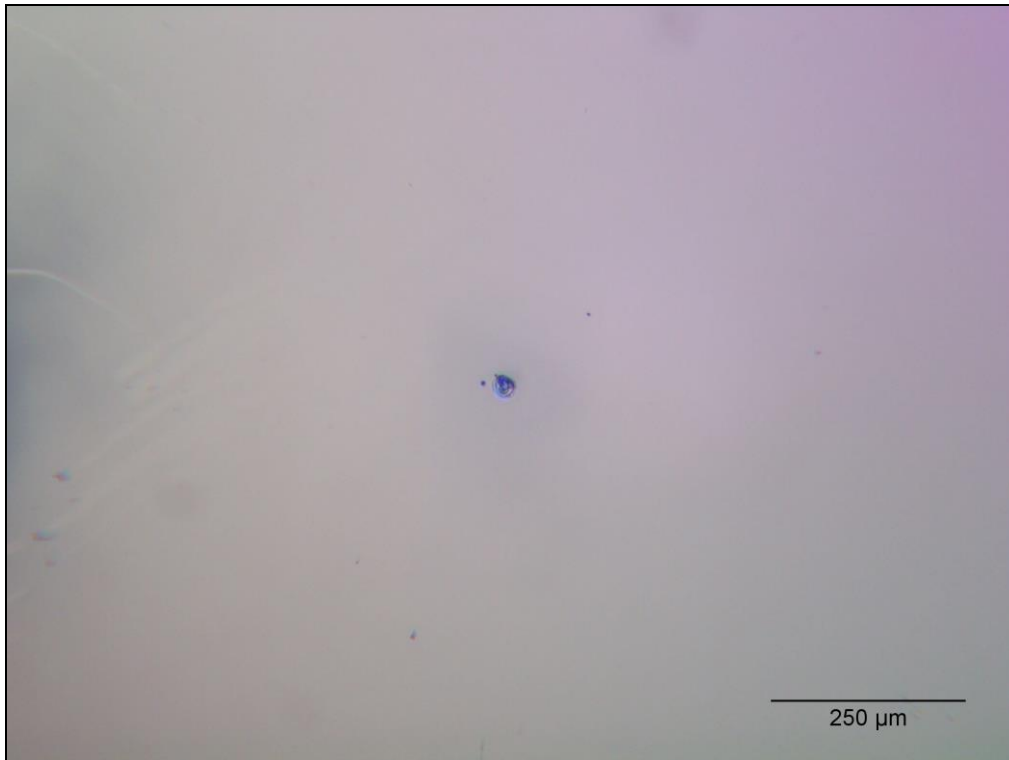


Fig. 5. Typical rear surface damage morphology
(Energy density 30.42 J/cm², damage after 11 pulses)

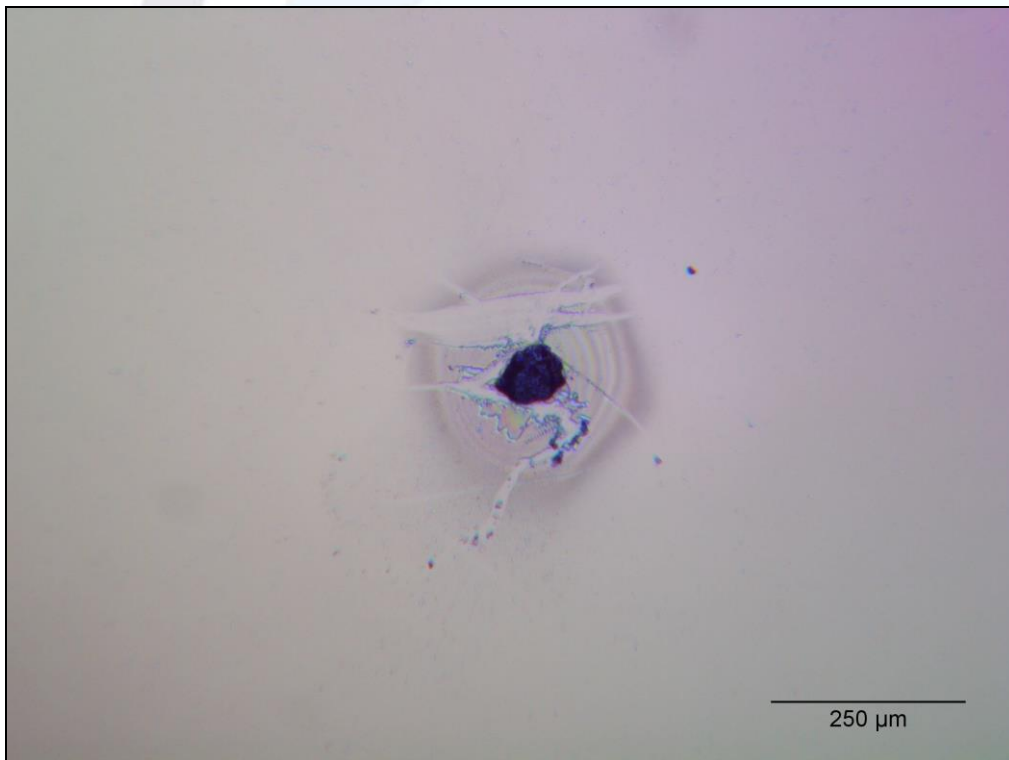


Fig. 6. Typical rear surface damage morphology
(Energy density 12.40 J/cm², damage after 1000 pulses)