

# Laser-Induced Damage Threshold (LIDT) Measurement Report

## ISO21254-2: S-on-1 Test Procedure

Sample: R14006-11

**Request from:**

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Tester/date:

E. Pupka / 2015-06-09

**Specimen**

Name of sample:

R14006-11

Type of specimen:

Yb:YAG, IAD dielectric coating

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 <sub>00</sub>
Longitudinal beam profile:	Single mode (SLM)
Beam diameter in target plane <sub>(1/e<sup>2</sup>)</sub> :	250.0 ± 5.4 μm (average from 64 pulses)
Pulse duration:	10.2 ns

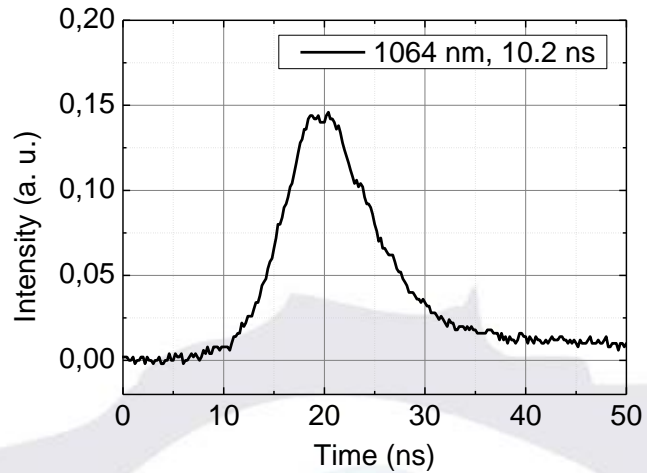
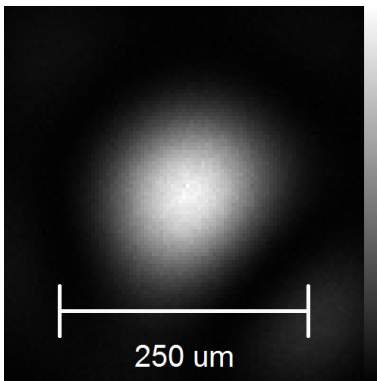


Fig. 1. Spatial beam profile in target plane (left) and oscilloscope curve (right).

**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**

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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 R14006-11.

Test mode	Threshold - front surface, J/cm <sup>2</sup>	Threshold - rear surface, J/cm <sup>2</sup>
10-on-1	13.02 ≤ 15.31 ≤ 17.77	13.44 ≤ 15.33 ≤ 17.33
1000-on-1	9.80 ≤ 12.32 ≤ 14.38	10.30 ≤ 12.33 ≤ 14.11

Measured at LIDARIS 2015-06-09  
www.lidarisis.com

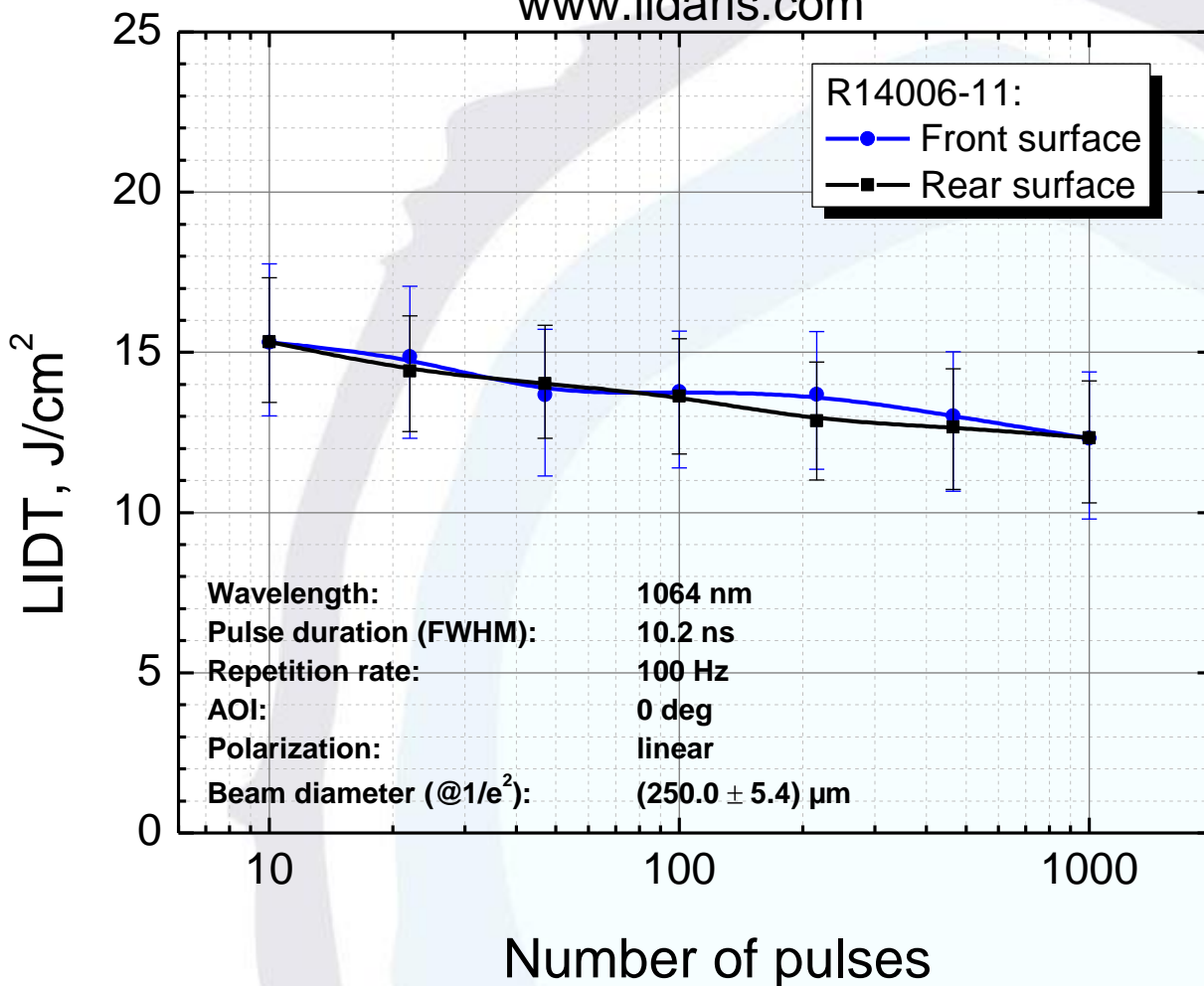
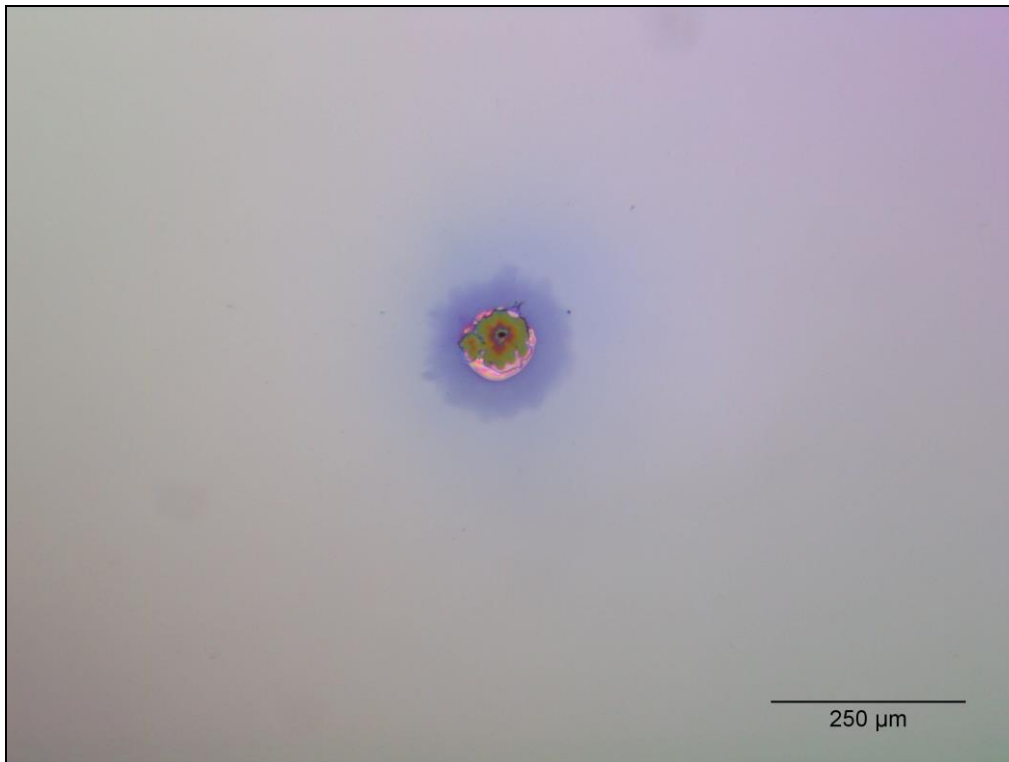
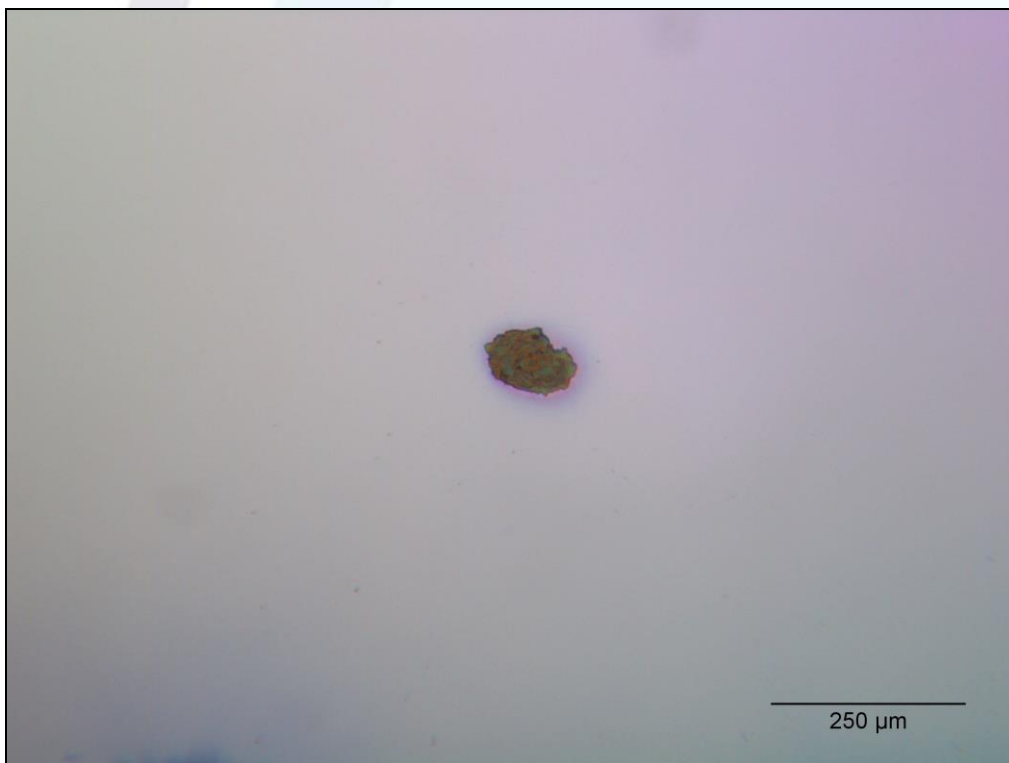


Fig. 2. Characteristic damage curve.

**Typical damage morphology:**



**Fig. 3. Typical front surface damage morphology  
(Energy density 27.54 J/cm<sup>2</sup>, damage after 12 pulses)**



**Fig. 4. Typical front surface damage morphology  
(Energy density 14.24 J/cm<sup>2</sup>, damage after 1000 pulses)**



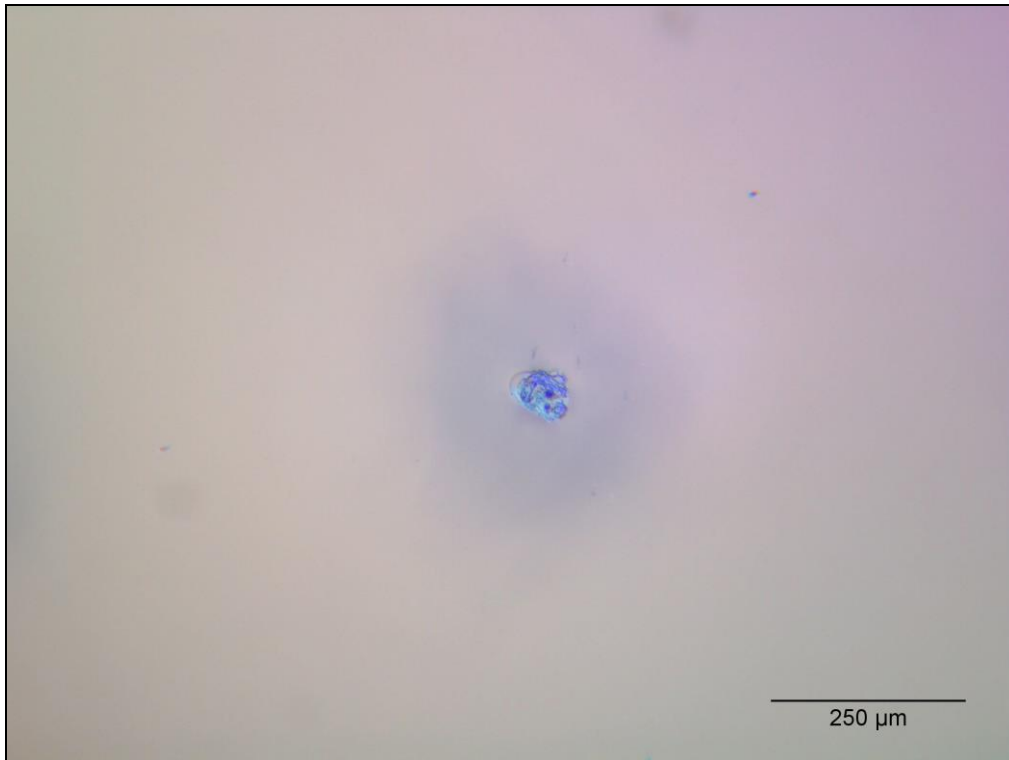


Fig. 5. Typical rear surface damage morphology  
(Energy density  $30.48 \text{ J/cm}^2$ , damage after 10 pulse)

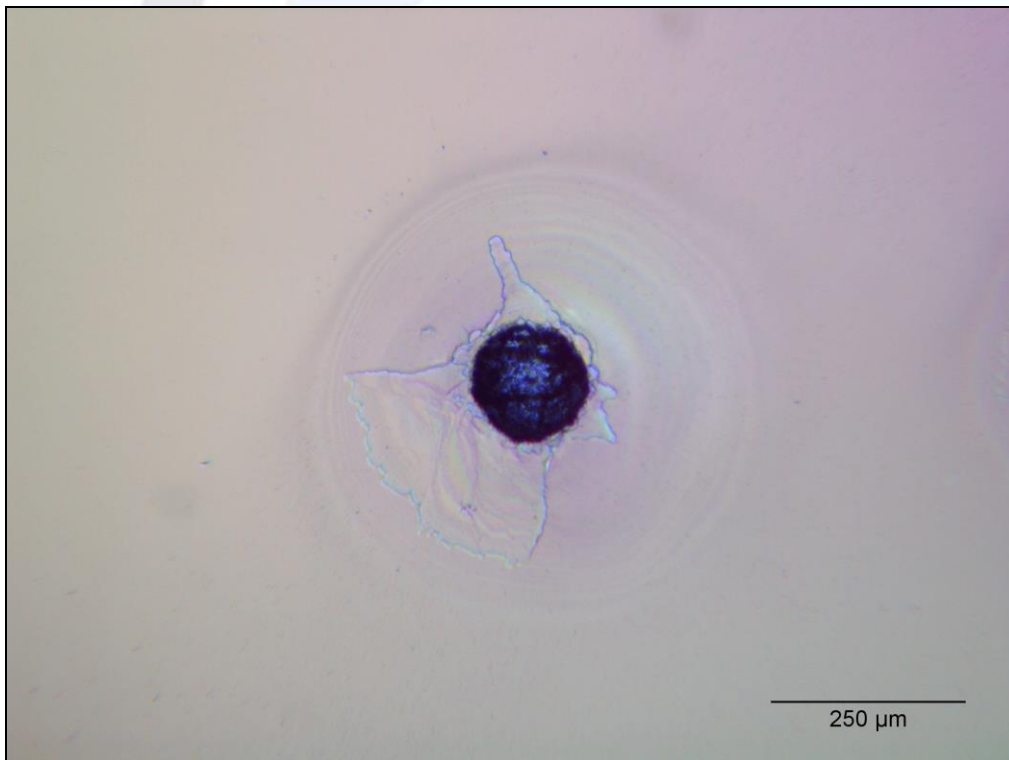


Fig. 6. Typical rear surface damage morphology  
(Energy density  $14.28 \text{ J/cm}^2$ , damage after 1000 pulses)