

Laser-Induced Damage Threshold (LIDT) Measurement Report

Damage Certification Test

Sample: Sample #3,2

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Tester/date: E. Pupka / 2014-04-29

Specimen

Name of sample: Sample #3,2;

Type of specimen: Glass, HR Dielectric Coating.

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

Test specification

Second harmonic of pulsed Nd:YAG InnoLas Laser: SpitLight Hybrid laser ($\lambda = 532$ nm, linear polarization, pulse duration 5.2 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

Wavelength: 532 nm;
Angle of incidence: 0 deg;
Polarisation state: linear;
Pulse repetition frequency: 50 Hz;
Spatial beam profile in target plane: TEM₀₀;
Longitudinal beam profile: Single mode (SLM);
Beam diameter in target plane ($1/e^2$): 198.98 μm (average from 64 pulses);
Pulse duration: 5.2 ns;

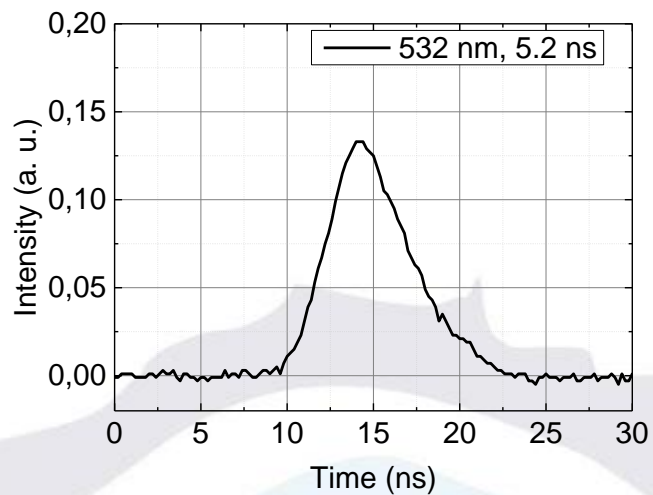
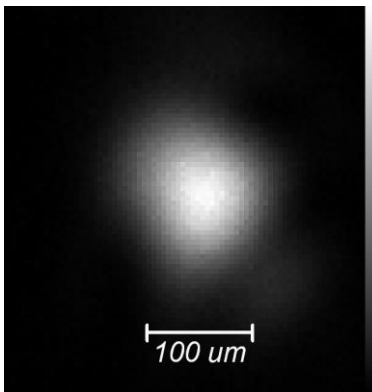


Fig 1 Spatial beam profile in target plane (left) and oscilloscope trace (right)

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

457;
Equally spaced;
800 μm;
Scattered light diode;
Optical paper, plastic box;
Industrial environment;
Compressed air;
Nonlinear fit to 0% of damage probability;

Test result:

Table 1 Summarized LIDT's for sample #3,2;

Test mode	Threshold, J/cm ²
1-on-1	25.9 ≤ 32.6 ≤ 39.0
1000-on-1	10.8 ≤ 13.9 ≤ 17.1

Measured at LIDARIS 2014-04-29
www.lidaris.com

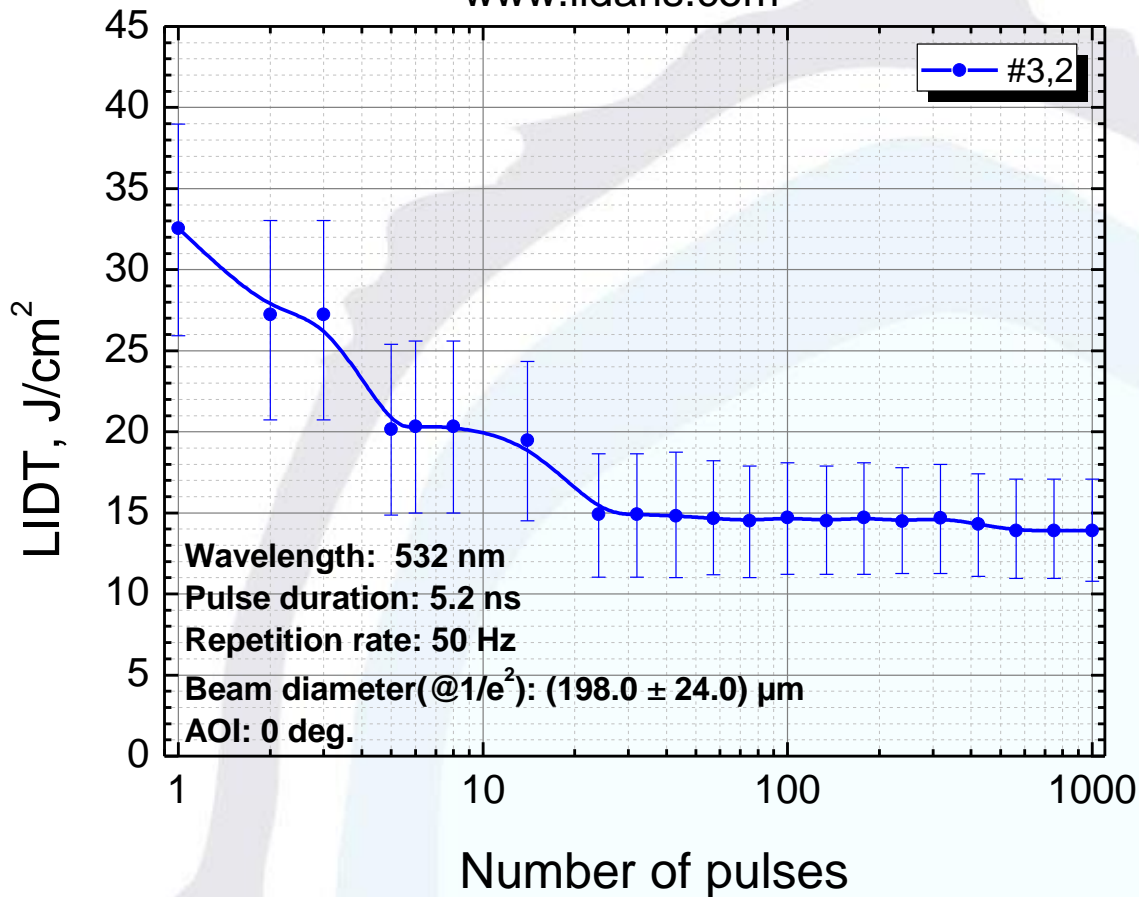


Fig. 2.

Typical damage morphology:

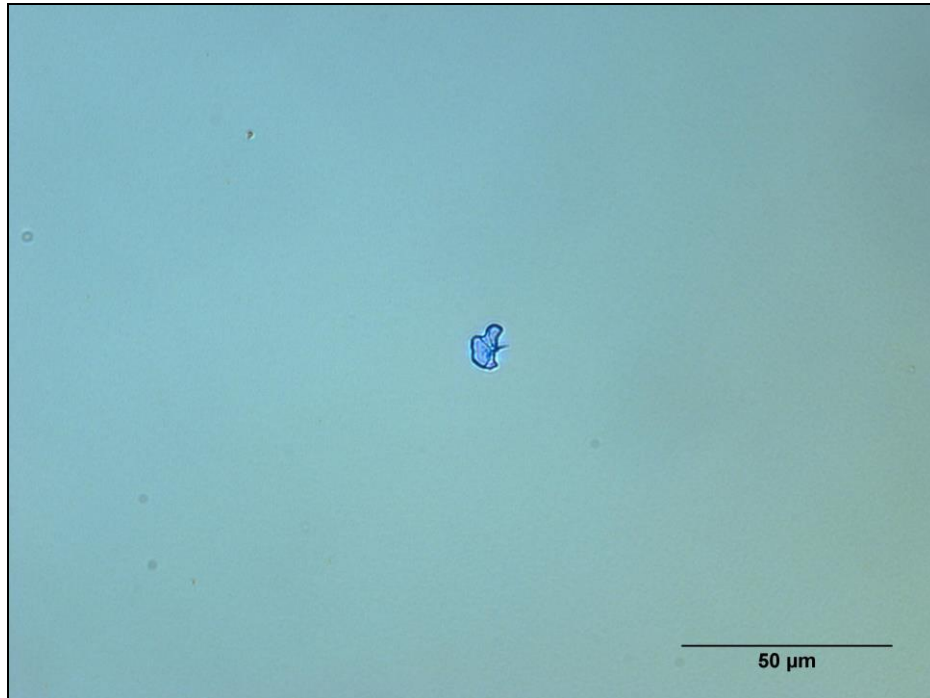


Fig. 3 Typical front surface damage morphology
(Energy density 33.07 J/cm^2 , damage after 1 pulse)

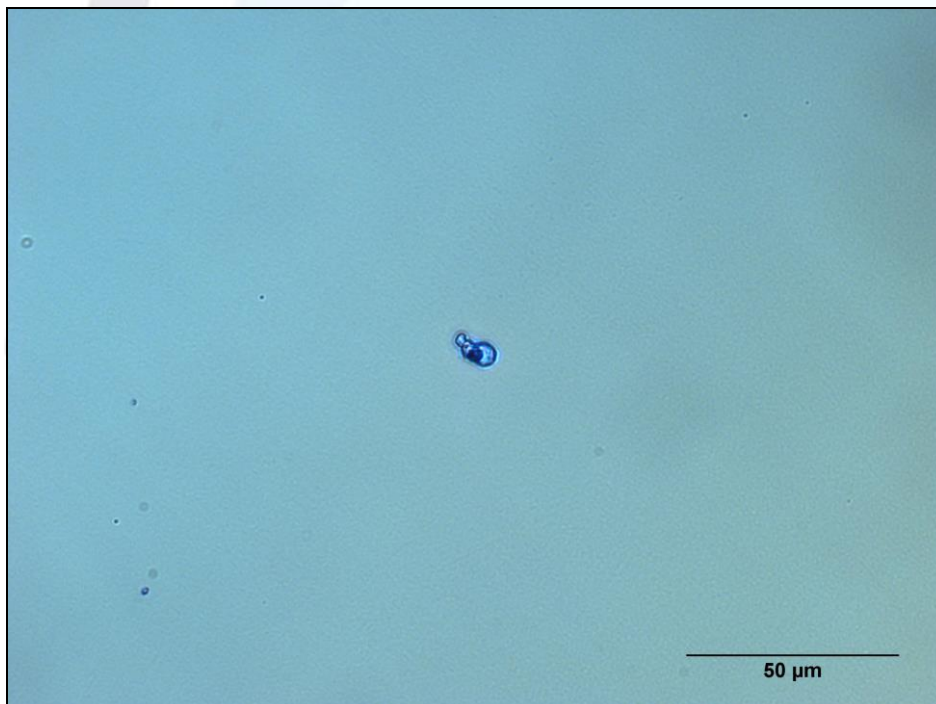


Fig. 4 Typical front surface damage morphology
(Energy density 13.54 J/cm^2 , damage after 24 pulses)