

Laser Diode Polymerization



Overview

This visible-light approach enables fast and spatially controlled polymerization while avoiding the drawbacks of conventional methods (thermal heating, UV synthesis), such as the use of toxic initiators like AIBN and the need for UV shielding. 1 Department of Conservative Dentistry, School of Dentistry, Pusan National University, Yangsan, Korea. The ultrafast light source is based on a diode laser with segmented metallisation to realise a wave-guide integrated. entistry benefit from laser technology, including surgery, conservative care, polymerization, tooth whitening, and photodynamic therapy. The experimental results are analyzed with a newly developed 2PP model. Even with low pulse peak. Diode laser (445 nm) achieved better polymerization efficiency at the same fluence compared to the LED unit at 3-mm depth, implying a better mechanical behavior and potential improved adhesion of the luting material to dentin. You do not currently have access to this content.



Article Content

Influence of Light Intensity and Irradiation Time on Efficacy of ...

Table (1) The recorded average temperature at the time of irradiation using different levels of light intensity for laser diode and three

Effect of a Diode Laser (445 nm) on Polymerization Efficiency of a ...

The aim of this study was to evaluate the polymerization efficiency of a preheated resin composite used as a luting agent for indirect

Effect of two lasers on the polymerization of composite ...

As polymerization progressed, specimens shrank away to the light source, and the aluminum disc under the resin

Laser Diode

Laser diode (LD) A laser diode (LD), also known as an injection diode laser, is a forward-biased semiconductor diode that emits

Mode-locked diode laser-based two-photon polymerisation

In this Letter, the authors present the construction of three-dimensional microstructures by two-photon polymerisation

Two-photon polymerization with diode lasers emitting ...

In this Letter, we investigate the resolution of two-photon polymerization (2PP) with an amplified mode-locked external

Two-photon polymerization-assisted 3D laser nanoprinting: from ...

Two-photon polymerization-based nanoprinting, also known as “two-photon lithography (2PL)” or “3D laser

Blue Laser for Polymerization of Bulk Fill Composites ...

Blue diode lasers are alternative curing devices for dental composites. The aim of this study was to investigate the

Mode-locked diode laser-based two-photon polymerisation

The laser beam of the mode-locked diode laser was coupled into the 2PP setup directly in front of an acoustic optic modulator, which

Pulsed laser photopolymerization: Kinetics, modeling and application

Abstract Ultra-short light pulses from conventional nanosecond pulsed laser were not so often used for the synthesis

Blue Laser for Polymerization of Bulk-Fill Composites: Influence on ...

Laser curing generally increased the DC and the maximum polymerization rate while it shortened the onset of the

Compact diode laser-based system for multi-photon polymerization

19 March 2025 Compact diode laser-based system for multi-photon polymerization with conventional resins

Laser diode

The laser diode chip removed and placed on the eye of a needle for scale A laser diode with the case cut away. The laser diode chip

(PDF) Blue Laser for Polymerization of Bulk-Fill ...

The objective of this study was to compare the polymerization kinetics of bulk-fill resin composites cured with a LED

Two decades of two-photon lithography: Materials science perspective ...

In recent decades, two-photon lithography (TPL) has emerged as a promising technique that employs direct laser

Two-Photon Laser Polymerization: From Fundamentals to Biomedical ...

Three-dimensional material microstructuring by femtosecond laser-induced two-photon polymerization is emerging as

Blue Laser for Polymerization of Bulk-Fill Composites: Influence on ...

The objective of this study was to compare the polymerization kinetics of bulk-fill resin composites cured with a LED-curing device

Selective Laser Sintering of Polymers: Process

Selective laser sintering (SLS) is a bed fusion additive manufacturing technology that

Two-photon polymerization with a 780 nm monolithic diode laser

Two-Photon Polymerization (2PP) is a high-precision additive manufacturing technique enabling the creation of intricate three

Influence of Light Intensity and Irradiation Time on Efficacy of ...

This study used two LED processing units versus diode laser methods to measure the temperature increase caused by

Two-Photon Polymerization – High Resolution 3D Laser ...

Two-photon polymerization (2 PP) is a direct laser writing technique, which allows the fabrication of 3D structures with a resolution

780 nm mode-locked monolithic diode laser for two-photon

With results largely comparable to typical Ti:Sa-based 2PP systems, our diode laser outperforms established systems

[Composite Photopolymerization with Diode Laser | Request PDF](#)

In group A were teeth intended for polymerization by LED B lamp, and group B comprised teeth to be polymerized by

[Laser-Assisted Visible-Light Polymerization for Rapid Synthesis of ...](#)

This study demonstrated a green, efficient, and highly controllable laser-assisted polymerization technique, offering a

[Laser Photopolymerization | Springer Nature Link](#)

laser-induced photopolymerization is a new rapid prototyping technique that can be used in free-form manufacturing of high aspect

[Rapid fabrication of a polymer lens on a laser chip for miniaturized ...](#)

However, although it is smaller than for a LED or for a standard edge-emitting laser diode, the beam divergence of this

[Polymer light emitting diodes: new materials and devices](#)

Single layer polymer light emitting diodes (LEDs) are ideal candidates for practical applications due to their easy

[High-Precision and Rapid Direct Laser Writing Using a Liquid Two](#)

Two-photon polymerization based direct laser writing (DLW) is an emerging micronano 3D fabrication technology

[Effect of 457 nm Diode-Pumped Solid State Laser on the](#)

Objective: The purpose of the present study was to test the usefulness of 457 nm diode-pumped solid state (DPSS) laser as a light

[Multiphoton lithography](#)

Animation of the multiphoton-polymerization process Hence, multiphoton lithography is a technique for creating small features in a

[Combination of diode laser-based two-photon polymerization and](#)

Two-Photon Polymerization (2PP) is an additive manufacturing technique capable of producing intricate three

[Compact diode laser-based system for multi-photon polymerization](#)

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Two-Photon Polymerization Lithography for Optics and Photonics ...

Two-photon polymerization lithography-based 3D printing has been intensively used in optics and photonic applications in recent

(PDF) Composite Photopolymerization with Diode Laser

Today, four main polymerization types are available, i.e. halogen bulbs, plasma arc lamps, argon ion lasers, and light emitting

Pulsed Laser Polymerization

Abstract Pulsed laser polymerization (PLP) has emerged as a leading technique to determine radical polymerization characteristics.

3D Printing at Micro-Level: Laser-Induced Forward Transfer and Two ...

Laser-induced forward transfer (LIFT) and two-photon polymerization (TPP) have proven their abilities to produce 3D

Effectiveness of photopolymerization in composite resins using a novel ...

Challenges especially in the minimal invasive restorative treatment of teeth require further developments of composite

(PDF) Composite Photopolymerization with Diode Laser

However, for complete evaluation of efficiency - also a higher temperature rise and polymerization efficiency of the diode laser as a light source

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