

 Presentation

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Femtosecond laser-induced micromachining and defect formation in silicon carbide

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Abstract

Direct laser writing is a well-established, cost-effective fabrication technique. This study investigates femtosecond laser writing on silicon carbide (SiC), a material promising for quantum photonics, sensing, and metrology. We examine the incubation effect from varying laser pulses, finding that optical breakdown is primarily due to multiphoton interactions, with an incubation parameter of 0.045, single pulse damage threshold fluence of 0.88 J/cm², and a two-photon absorption cross-section of 4.3 × 10⁻⁶⁰ cm⁴ s/photon. We also explore how these thresholds influence SiC's Raman and photoluminescence spectra, revealing additional silicon phases and femtosecond laser-induced color centers.

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