Structural transformations of atomic nitrogen during bulk femtosecond laser micromarking of natural diamond

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Interaction of intensive laser radiation with diamond provide unique ability to precisely initiate changes in diamond structure not only at the surface but also in the bulk [1, 2]. However, many of underlying basic physical questions concerning the appearance and transformations of optically active nitrogen under laser irradiation, remains unclear [3].

Every diamond has its own growing conditions, properties and chemical compositions, which makes the creation of a common marking method quite complicated.

In this work we studied bulk photoluminescence micromarking of natural colorless high-nitrogen IaAB type diamond and transformations of optically active nitrogen color-centers, using technique of 3D confocal PL/Raman microspectroscopy with double wavelength (405 nm and 532 nm) excitation.

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