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标题: Second Harmonic Generation in GaN-based photonic crystals for single molecule investigations
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摘要: III-Nitride semiconductors are promising nonlinear materials for optical wavelength conversion. However second harmonic generation in bulk GaN is weak because GaN is strongly dispersive. We show that appropriate photonic crystal patterning in GaN helps to overcome dispersion and provides quasi-phase matching conditions, resulting in substantially increased conversion efficiency obtained in a flexible manner. Enhancement factors of more than five orders of magnitude can be achieved. Use of photonic crystals makes it possible to reduce the effective observation volume, thereby opening new opportunities such as the study of single-molecule dynamics, even in high concentration solutions. We have demonstrated sharp enhancement of the fluorescence of single molecules immobilized on the surface of a GaN photonic crysta,l when the molecules are excited via the resonant second harmonic generation process.
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