

Supplementary Information

Efficient Second- and Third-Harmonic Generations in $\text{Er}^{3+}/\text{Fe}^{2+}$ -Doped Lithium Niobate Single Crystal with Engineered Surficial Cylindrical Hole Arrays

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The second harmonic generation and third harmonic generation were measured by using the optical path in Fig. S1. The nanosecond/femtosecond laser was filtered by using a bandpass filter centered at 1064 nm/1550 nm. The first beam splitter (BS) was used to monitor the power/energy of the laser pulses. And the laser beam injected onto the surface of the sample vertically. Another BS was used to monitor the power of the SHG. Both the power/energy of the laser and SHG was recorded by using a power meter. And the spectra of SHG and THG were recorded using the spectrometer (QE65 Pro, Ocean Optics Inc.).

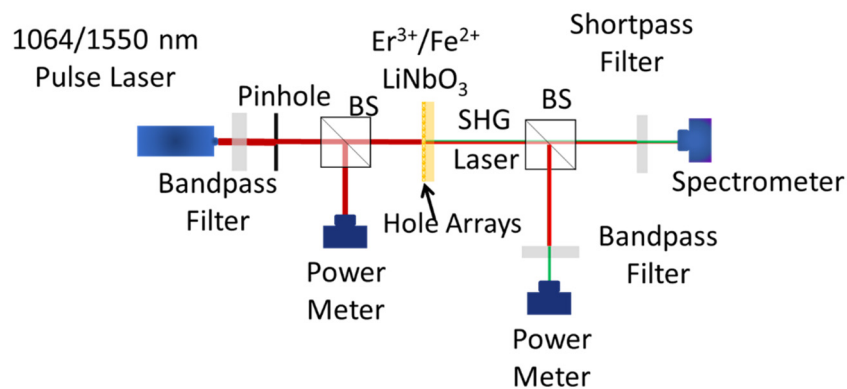


Figure S1 The schematic of the optical path for SHG and THG measurement in $\text{Er}^{3+}/\text{Fe}^{2+}$ doped LiNbO_3 thin films.

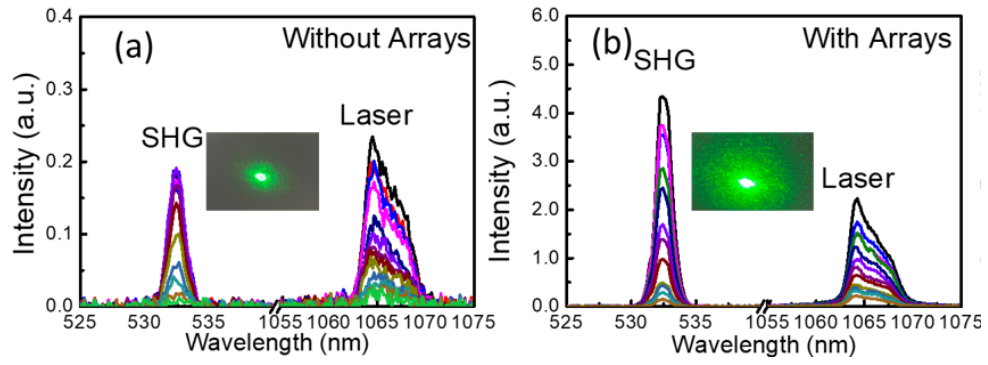


Figure S2 The spectra of fundamental frequency laser and SHG with the increase of excitation energy in (a) unpatterned sample and (b) surficial patterned sample