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## Manipulating upconversion luminescence intensity in a single crystal particle with waveguide structure

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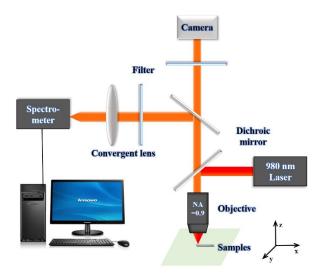


Fig. S1 Schematic setup of the confocal microscopy system for characterization of a single MT.

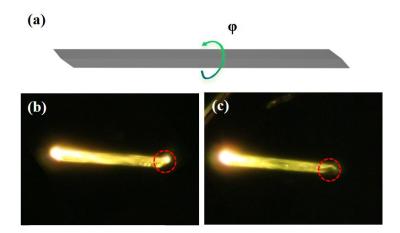


Fig. 1. (a) Schematic of a single  $\beta$ -NaYF<sub>4</sub>: Yb<sup>3+</sup>, Er<sup>3+</sup> MT with the wedge-shaped end plane. (b and c) UCL pattern photographs of the single  $\beta$ -NaYF<sub>4</sub>: Yb<sup>3+</sup>, Er<sup>3+</sup> MT when the rotation angle is 45° and 90°, respectively.