Self-suspended rare-earth doped up-conversion luminescent waveguide: propagating and directional radiation

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Fig. S1–Fig. S3

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Fig. S1 | TEM (a–b) and optical (c) images of ordinary disk-shaped NaYF₄:Yb³⁺/Er³⁺ microcrystal. For the unsuspended disk-like waveguide, it was impossible to realize directional radiation.

Fig. S2 | UC fluorescence patterns and Fourier images of the selected region of single crown-shaped (a-b) and ordinary-shaped (c-d) NaYF₄:Yb³⁺/Er³⁺. Luminescence spectra (e) of single crown-shaped and ordinary-shaped NaYF₄:Yb³⁺/Er³⁺.

Fig. S3 | Polarization dependent radiation modes of the self-suspended luminescent waveguide. The directional emission (a) and the optical patterns (b) on the image plane with different polarization directions. For different polarizations, the Fourier images remained nearly unchanged.