

Electronic Supplementary Material

**Enhancing Static Green Upconversion Luminescence of NaY(MoO₄)₂:
Er/Yb Microcrystals via Annealing Strategy for Anti-counterfeiting
Applications**

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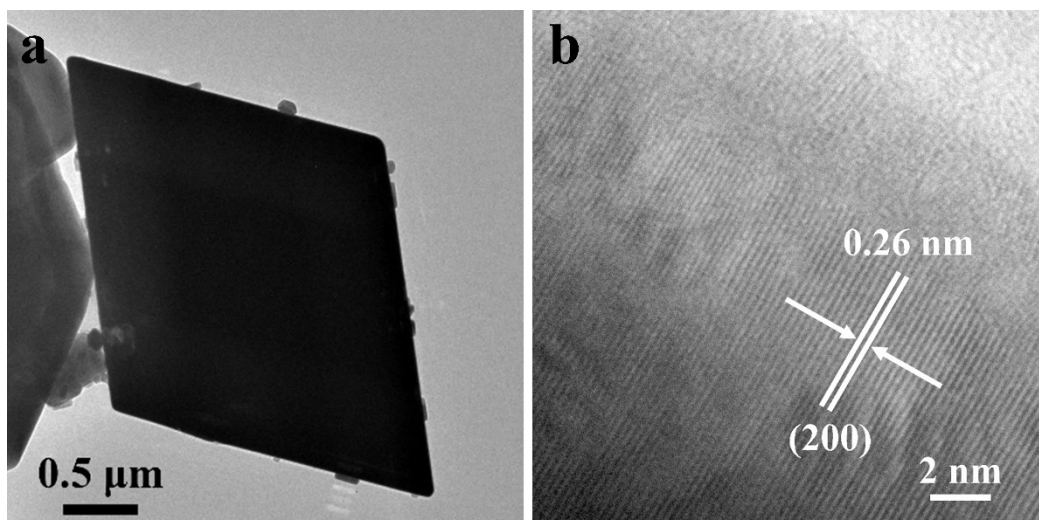


Fig. S1 (a) TEM and (b) high resolution TEM images of an as-synthesized $\text{NaY}(\text{MoO}_4)_2: \text{Yb}^{3+}/\text{Er}^{3+}$ (40/2 %) micro-octahedron.

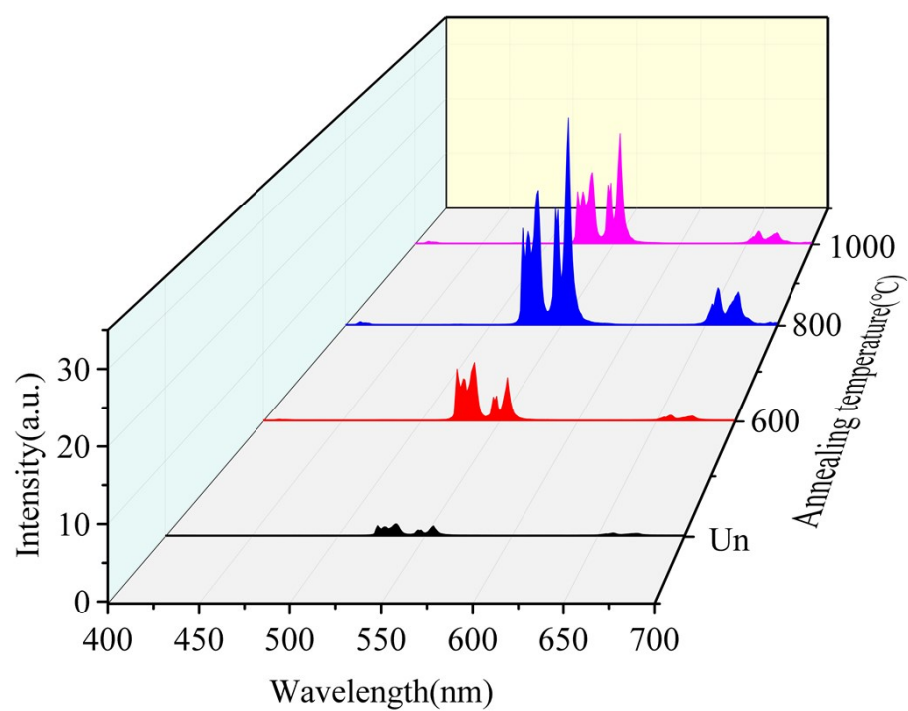


Fig. S2 UC emission spectra of a series of NaYb(MoO₄)₂: 2% Er³⁺ micro-octahedrons annealing at varying temperatures upon excitation at 980 nm.

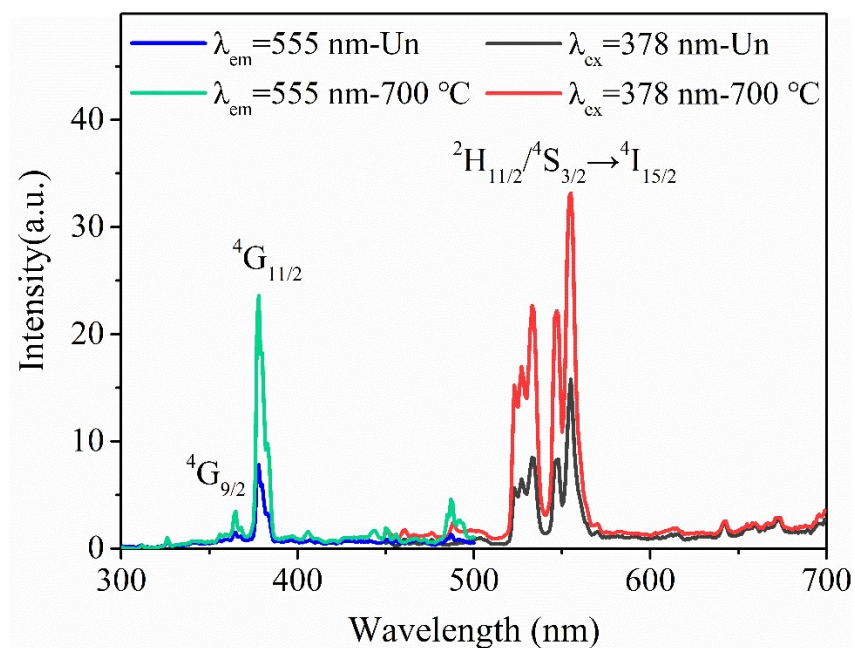


Fig. S3 The excitation spectra monitoring at 555 nm and DS emission spectra excited at 378 nm for NaY(MoO₄)₂: Yb³⁺/Er³⁺ (40/2 %) micro-octahedrons before and after annealing at 700 °C.

Table S1 CIE chromaticity coordinate values of NaY(MoO₄)₂: Yb³⁺/Er³⁺ (40/2 %) micro-octahedrons annealing at varying temperatures upon excitation at 980 nm with a power density of 200 mW/cm².

Sample	CIE <i>x</i>	CIE <i>y</i>
Unannealed	0.2237	0.7257
500 °C	0.261	0.6586
600 °C	0.2204	0.7426
700 °C	0.2503	0.7222
800 °C	0.2486	0.7235
900 °C	0.2615	0.7111
1000 °C	0.2827	0.6804

Table S2 CIE chromaticity coordinate values of NaY(MoO₄)₂: Yb³⁺/Ho³⁺ (40/2 %)

micro-octahedrons annealing at a range of 800 to 1100 °C under excitation at 980 nm with a power density of 200 mW/cm².

Sample	CIE x	CIE y
Unannealed	0.51	0.4652
800 °C	0.4999	0.4944
900 °C	0.5342	0.4613
1000 °C	0.5133	0.4803
1100 °C	0.4995	0.4884

Table S3 CIE chromaticity coordinates of NaY(MoO₄)₂: Yb³⁺/Er³⁺ (40/2 %) micro-octahedrons before and after annealing at 700°C.

Sample	Power density (mW/cm ²)	CIE x	CIE y
Unannealed	350	0.2201	0.7354
Unannealing	400	0.2173	0.7399
Unannealing	500	0.1955	0.7544
Unannealing	600	0.1915	0.7689
Unannealing	750	0.1904	0.7657
700 °C	350	0.2301	0.7222
700 °C	400	0.2456	0.7237
700 °C	500	0.2494	0.7242
700 °C	600	0.2409	0.7245
700 °C	750	0.2483	0.7251

Table S4 CIE chromaticity coordinates of NaY(MoO₄)₂: Yb³⁺/Er³⁺ (*x*/2 %, *x*=20, 40, 60 and 80) and NaYb(MoO₄)₂: *y*% Er³⁺ (*y*=2, 4, 6, 8 and 10) micro-octahedrons.

Dopants	Concentration	CIE x	CIE y
Yb/Er (<i>x</i> /2 %)	20	0.2279	0.7006
Yb/Er (<i>x</i> /2 %)	40	0.2232	0.7273
Yb/Er (<i>x</i> /2 %)	60	0.2567	0.6872
Yb/Er (<i>x</i> /2 %)	80	0.2342	0.7035
Yb/Er (40/ <i>y</i> %)	2	0.2179	0.7466
Yb/Er (40/ <i>y</i> %)	4	0.2272	0.7365
Yb/Er (40/ <i>y</i> %)	6	0.2301	0.7195
Yb/Er (40/ <i>y</i> %)	8	0.2385	0.7117
Yb/Er (40/ <i>y</i> %)	10	0.2446	0.7065