

Supporting Information

Synthesis and luminescence properties of Yb³⁺/Er³⁺-doped Bi₂(MoO₄)_{3-z}(WO₄)_z phosphors for optical thermometry

Huimin Du, Yanyang Li, Mengran Ouyang, Meifang Liu, Shanshan Hu* and Jun Yang*

School of Chemistry and Chemical Engineering, Southwest University, No. 2 Tiansheng Road, Beibei District, Chongqing 400715, China.

E-mail: jyang@swu.edu.cn, hushan3@swu.edu.cn

Table. S1 The unit cell parameters of Rietveld refined Bi₂(MoO₄)₃ and Bi₂(MoO₄)₃: y% Yb³⁺, 3%Er³⁺ (y = 2, 6, 10, 14, 18) samples

Compound	Bi ₂ (MoO ₄) ₃	Bi ₂ (MoO ₄) ₃ : 2%Yb ³⁺ , 3%Er ³⁺	Bi ₂ (MoO ₄) ₃ : 6%Yb ³⁺ , 3%Er ³⁺	Bi ₂ (MoO ₄) ₃ : 10%Yb ³⁺ , 3%Er ³⁺	Bi ₂ (MoO ₄) ₃ : 14%Yb ³⁺ , 3%Er ³⁺	Bi ₂ (MoO ₄) ₃ : 18%Yb ³⁺ , 3%Er ³⁺
	Space group	P121/n1	P121/n1	P121/n1	P121/n1	P121/n1
<i>a</i> , Å	7.71801	7.71129	7.70086	7.69583	7.69497	7.69048
<i>b</i> , Å	11.51745	11.50829	11.4904	11.48587	11.48534	11.47907
<i>c</i> , Å	11.12542	11.11645	11.10031	11.09568	11.09396	11.08842
<i>V</i> , Å ³	962.097	959.721	955.546	954.089	953.833	952.255
<i>Z</i>	4	4	4	4	4	4
2θ-range, °	10°-60°	10°-60°	10°-60°	10°-60°	10°-60°	10°-60°
<i>R</i> _{wp} , %	10.481	10.991	11.514	10.412	12.584	10.349
<i>X</i> ²	2.40	2.50	2.68	2.53	3.01	2.37

Table. S2 The integrated intensity of green and red upconversion emission of $\text{Bi}_2(\text{MoO}_4)_3:14\%\text{Yb}^{3+}, 3\%\text{Er}^{3+}$ at different pump powers

pump power (mW)	The integral intensity of green light region(cps)	The integral intensity of red light region (cps)
557	334322.33	43331.72
700	513599.52	57493.51
859	745642.50	79137.11
1006	984747.75	98267.58
1150	1279955.68	122907.75
1519	2017475.40	189164.15
1883	2711036.24	255322.67
2160	3438089.83	322904.36

Table. S3 The fluorescence lifetimes of $^2\text{H}_{11/2}$ (530 nm), $^4\text{S}_{3/2}$ (552 nm) and $^4\text{F}_{9/2}$ (659 nm) energy levels under the excitation of 980 nm light source in $\text{Bi}_2(\text{MoO}_4)_3: y\%\text{Yb}^{3+}, 3\%\text{Er}^{3+}$ (y=2, 6, 10, 14, 18) phosphors

Energy level	$\text{Bi}_2(\text{MoO}_4)_3:y\%\text{Yb}^{3+}, 3\%\text{Er}^{3+}$				
	y=2	y=6	y=10	y=14	y=18
$^2\text{H}_{11/2}$	30.49 μs	34.53 μs	48.58 μs	63.40 μs	48.87 μs
$^4\text{S}_{3/2}$	29.23 μs	31.78 μs	43.82 μs	59.44 μs	43.25 μs
$^4\text{F}_{9/2}$	22.30 μs	23.85 μs	30.40 μs	33.20 μs	22.68 μs