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Supporting Information

Crystal structure refinement and luminescence properties of Ce^{3+} singly doped and Ce^{3+}/Mn^{2+} co-doped $KBaY(BO_3)_2$ for n-UV pumped white-light-emitting diodes

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Table S1. The Refined Positions of All Atoms and The Lattice Parameters for A Series of $KBa_{0.995-0.5y}Y_{0.995-0.5y}(BO_3)_2$: $0.01Ce^{3+}$, yMn^{2+}(y=0, 0.01, 0.03, 0.05, and 0.07)

Sample	$KBa_{0.995}Y_{0.995}(BO_3)_2$: 0.01 Ce^{3+}				
Atom	x	y	z	Occupancy	U_{iso}
Y	1.0000000(0)	0.0000000(0)	1.0000000(0)	0.978(0)	0.01784
Ba	1.0000000(0)	0.0000000(0)	0.7861470(0)	0.479(0)	0.02389
K	1.0000000(0)	0.0000000(0)	0.7861470(0)	0.519(0)	0.02389
Ce(1)	1.0000000(0)	0.0000000(0)	0.7861470(0)	0.005(3)	0.02389
Ce(2)	1.0000000(0)	0.0000000(0)	1.0000000(0)	0.005(0)	0.01784
B	0.6667000(0)	0.3333000(0)	0.7436000(0)	1.000(0)	0.02769
O	0.5204000(0)	0.4796000(0)	0.7449300(0)	1.000(0)	0.01512
Sample	$KBa_{0.99}Y_{0.99}(BO_3)_2$: $0.01Ce^{3+}$, $0.01Mn^{2+}$				
Atom	x	y	z	Occupancy	U_{iso}
Y	1.0000000(0)	0.0000000(0)	1.0000000(0)	0.959(0)	0.01990
Ba	1.0000000(0)	0.0000000(0)	0.7862240(0)	0.485(0)	0.02651
K	1.0000000(0)	0.0000000(0)	0.7862240(0)	0.504(0)	0.02651
Ce(1)	1.0000000(0)	0.0000000(0)	0.7862240(0	0.004(0)	0.02651
Ce(2)	1.0000000(0)	0.0000000(0)	1.0000000(0)	0.005(0)	0.01990
Mn(1)	1.0000000(0)	0.0000000(0)	0.7862240(0	0.006(0)	0.02651
Mn(2)	1.0000000(0)	0.0000000(0)	1.0000000(0)	0.004(0)	0.01990
B	0.6667000(0)	0.3333000(0)	0.7436000(0)	1.000(0)	0.02335
O	0.5204000(0)	0.4796000(0)	0.7449300(0)	1.000(0)	0.02713
Sample	$KBa_{0.98}Y_{0.98}(BO_3)_2$: $0.01Ce^{3+}$, $0.03Mn^{2+}$				
Atom	x	y	z	Occupancy	U_{iso}
Y	1.0000000(0)	0.0000000(0)	1.0000000(0)	0.964(0)	0.01699
Ba	1.0000000(0)	0.0000000(0)	0.7855820(0)	0.488(0)	0.02575
K	1.0000000(0)	0.0000000(0)	0.7855820(0)	0.515(0)	0.02575
Ce(1)	1.0000000(0)	0.0000000(0)	0.7855820(0)	0.003(0)	0.02575
Ce(2)	1.0000000(0)	0.0000000(0)	1.0000000(0)	0.005(2)	0.01699
Mn(1)	1.0000000(0)	0.0000000(0)	0.7855820(0)	0.016(0)	0.02575
Mn(2)	1.0000000(0)	0.0000000(0)	1.0000000(0)	0.015(0)	0.01699
B	0.6667000(0)	0.3333000(0)	0.7436000(0)	1.000(0)	0.00931

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O	0.5204000(0)	0.4796000(0)	0.7449300(0)	1.000(0)	0.01460

Sample	$KBa_{0.97}Y_{0.97}(BO_3)_2$: $0.01Ce^{3+}$, $0.05Mn^{2+}$				
Atom	x	y	z	Occupancy	U_{iso}
Y	1.0000000(0)	0.0000000(0)	1.0000000(0)	0.896(0)	0.01903
Ba	1.0000000(0)	0.0000000(0)	0.7860870(0)	0.455(0)	0.02936
K	1.0000000(0)	0.0000000(0)	0.7860870(0)	0.522(0)	0.02936
Ce(1)	1.0000000(0)	0.0000000(0)	0.7860870(0)	0.004(0)	0.02936
Ce(2)	1.0000000(0)	0.0000000(0)	1.0000000(0)	0.006(0)	0.01903
Mn(1)	1.0000000(0)	0.0000000(0)	0.7860870(0)	0.025(4)	0.02936
Mn(2)	1.0000000(0)	0.0000000(0)	1.0000000(0)	0.022(0)	0.01903
B	0.6667000(0)	0.3333000(0)	0.7436000(0)	1.000(0)	0.03035
O	0.5204000(0)	0.4796000(0)	0.7449300(0)	1.000(0)	0.02843

Sample	$KBa_{0.96}Y_{0.96}(BO_3)_2$: $0.01Ce^{3+}$, $0.07Mn^{2+}$				
Atom	x	y	z	Occupancy	U_{iso}
Y	1.0000000(0)	0.0000000(0)	1.0000000(0)	0.953(0)	0.01611
Ba	1.0000000(0)	0.0000000(0)	0.7850790(0)	0.508(0)	0.02927
K	1.0000000(0)	0.0000000(0)	0.7850790(0)	0.505(0)	0.02927
Ce(1)	1.0000000(0)	0.0000000(0)	0.7850790(0)	0.003(0)	0.02927
Ce(2)	1.0000000(0)	0.0000000(0)	1.0000000(0)	0.006(0)	0.01611
Mn(1)	1.0000000(0)	0.0000000(0)	0.7850790(0)	0.038(0)	0.02927
Mn(2)	1.0000000(0)	0.0000000(0)	1.0000000(0)	0.034(0)	0.01611
B	0.6667000(0)	0.3333000(0)	0.7436000(0)	1.000(0)	0.02000
O	0.5204000(0)	0.4796000(0)	0.7449300(0)	1.000(0)	0.01633