

Table S1. Fractional atomic coordinates and isotropic or equivalent isotropic displacement parameters (\AA^2) of $\text{PbLnB}_7\text{O}_{13}$ (Ln=Tb, Eu).

$\text{PbTbB}_7\text{O}_{13}$	x	y	z	$U_{\text{iso}}^*/U_{\text{eq}}$
Pb1	0.16273 (17)	0.58706 (11)	0.36068 (8)	0.0113 (3)
Pb2	0.33540 (16)	0.69375 (10)	0.63876 (8)	0.0104 (3)
Tb1	-0.4990 (3)	0.76578 (14)	0.99917 (11)	0.0042 (4)
Tb2	0.0010 (2)	0.51822 (14)	1.00734 (11)	0.0044 (4)
O1	0.755 (3)	0.530 (2)	0.2741 (14)	0.003 (4)
O2	0.674 (3)	0.534 (2)	0.4251 (14)	0.008 (3)
O3	0.447 (3)	0.524 (3)	0.2663 (16)	0.008 (3)
O4	0.417 (2)	0.578 (2)	0.4967 (14)	0.005 (2)
O5	0.242 (2)	0.9203 (19)	0.1088 (13)	0.007 (3)
O6	0.339 (2)	0.6667 (18)	0.1123 (13)	0.004 (3)
O7	0.278 (3)	0.786 (3)	0.2637 (15)	0.004 (4)
O8	0.333 (2)	0.934 (2)	0.4175 (14)	0.009 (4)
O9	0.425 (3)	1.009 (3)	0.2632 (16)	0.008 (4)
O10	0.050 (2)	0.7191 (17)	0.1200 (12)	0.006 (3)
O11	-0.252 (2)	0.6709 (18)	0.1129 (13)	0.005 (3)
O12	-0.067 (3)	0.778 (3)	0.2707 (16)	0.005 (4)
O13	-0.138 (2)	0.875 (2)	0.4199 (14)	0.007 (4)
O14	0.074 (2)	0.686 (2)	0.5003 (14)	0.008 (3)
O15	-0.163 (3)	0.780 (2)	0.5731 (15)	0.008 (3)
O16	-0.256 (3)	0.769 (2)	0.7341 (16)	0.008 (3)
O17	0.052 (3)	0.757 (3)	0.7290 (16)	0.010 (4)
O18	-0.041 (2)	0.7204 (16)	0.8929 (11)	0.004 (3)
O19	-0.347 (2)	0.6714 (19)	0.8825 (13)	0.006 (3)
O20	0.153 (2)	0.919 (2)	0.8792 (13)	0.007 (3)
O21	0.461 (2)	0.9688 (16)	0.8915 (11)	0.003 (3)
O22	0.258 (2)	0.6689 (19)	0.8784 (13)	0.005 (2)
O23	0.225 (3)	0.505 (3)	0.7284 (16)	0.009 (5)
O24	0.158 (2)	0.4189 (18)	0.8939 (12)	0.003 (3)
O25	0.457 (2)	0.4694 (17)	0.8875 (12)	0.005 (3)
O26	0.244 (2)	0.4213 (19)	1.1203 (13)	0.005 (3)
B1	0.629 (4)	0.533 (3)	0.318 (2)	0.003 (4)
B2	0.585 (4)	0.523 (3)	0.498 (2)	0.003 (4)
B3	0.362 (4)	0.915 (4)	0.316 (2)	0.004 (2)
B4	-0.148 (4)	0.886 (4)	0.3195 (15)	0.004 (2)
B5	-0.062 (4)	0.776 (3)	0.494 (2)	0.005 (3)
B6	-0.111 (4)	0.764 (3)	0.681 (2)	0.004 (2)
B7	0.232 (5)	0.776 (4)	0.151 (3)	0.008 (3)
B8	-0.230 (5)	0.773 (4)	0.836 (3)	0.007 (4)
B9	0.102 (5)	0.764 (4)	0.839 (3)	0.005 (3)

B10	0.283 (4)	1.025 (4)	0.848 (3)	0.007 (6)
B11	0.391 (4)	0.517 (4)	1.155 (3)	0.005 (3)
B12	0.279 (5)	0.516 (4)	0.850 (3)	0.008 (4)
B13	0.614 (5)	0.516 (4)	0.849 (3)	0.004 (2)
B14	-0.103 (5)	0.772 (4)	0.158 (3)	0.004 (6)
PbEuB ₇ O ₁₃	<i>x</i>	<i>y</i>	<i>z</i>	<i>U</i> _{iso} [*] / <i>U</i> _{eq}
Pb1	0.33486 (14)	0.81823 (8)	0.63852 (6)	0.0101 (3)
Pb2	0.16309 (14)	0.92372 (8)	0.36117 (6)	0.0096 (3)
Eu1	0.4989 (2)	0.25105 (12)	0.00072 (8)	0.0032 (4)
Eu2	-0.0009 (2)	0.49863 (12)	-0.00767 (9)	0.0028 (3)
B1	0.118 (4)	0.265 (3)	0.3226 (19)	0.002 (4)
B2	-0.374 (4)	-0.007 (3)	0.3174 (18)	0.002 (3)
B3	0.358 (4)	0.611 (4)	0.316 (2)	0.005 (3)
B4	0.569 (3)	0.995 (3)	0.4998 (19)	0.005 (3)
B5	0.073 (3)	1.239 (3)	0.502 (2)	0.005 (3)
B6	0.147 (5)	1.140 (4)	0.679 (3)	0.016 (6)
B7	0.396 (4)	0.000 (4)	0.162 (2)	0.005 (3)
B8	0.230 (4)	0.258 (3)	0.156 (2)	0.002 (3)
B9	-0.108 (4)	0.253 (3)	0.156 (2)	0.003 (4)
B10	-0.281 (4)	0.004 (3)	0.159 (2)	0.005 (3)
B11	0.398 (4)	0.502 (3)	0.160 (2)	0.005 (3)
B12	0.231 (4)	0.744 (3)	0.151 (2)	0.002 (3)
B13	0.276 (4)	1.000 (3)	0.843 (2)	0.002 (3)
B14	0.107 (4)	1.251 (3)	0.850 (2)	0.002 (3)
O1	-0.330 (3)	0.003 (2)	0.4255 (14)	0.017 (4)
O2	-0.246 (3)	0.001 (2)	0.2702 (13)	0.005 (4)
O3	-0.2495 (17)	-0.1451 (14)	0.1127 (10)	0.004 (2)
O4	-0.1567 (16)	0.1046 (14)	0.1223 (9)	0.005 (2)
O5	-0.044 (2)	0.2652 (18)	0.2731 (13)	0.005 (4)
O6	0.164 (3)	0.2579 (19)	0.4247 (13)	0.008 (4)
O7	0.252 (3)	0.263 (2)	0.2696 (13)	0.006 (4)
O8	0.0412 (17)	0.2980 (13)	0.1079 (9)	0.005 (2)
O9	0.441 (2)	-0.0023 (18)	0.2668 (12)	0.003 (4)
O10	0.3411 (17)	-0.1457 (14)	0.1161 (10)	0.008 (3)
O11	0.5407 (15)	0.0477 (13)	0.1115 (9)	0.003 (2)
O12	0.2451 (16)	0.1026 (14)	0.1206 (9)	0.003 (2)
O13	0.3475 (16)	0.3522 (13)	0.1207 (9)	0.003 (2)
O14	0.423 (2)	0.511 (2)	0.2638 (13)	0.006 (4)
O15	0.2451 (16)	0.6023 (13)	0.1084 (9)	0.004 (2)
O16	0.0486 (17)	0.8018 (13)	0.1229 (9)	0.004 (2)
O17	0.281 (2)	0.735 (2)	0.2690 (13)	0.003 (4)
O18	0.337 (2)	0.593 (2)	0.4163 (13)	0.011 (4)

O19	0.075 (2)	0.815 (3)	0.4997 (13)	0.014 (4)
O20	0.418 (2)	0.924 (3)	0.4985 (12)	0.010 (4)
O21	0.138 (2)	1.148 (2)	0.5780 (13)	0.010 (4)
O22	0.227 (3)	1.017 (2)	0.7312 (14)	0.010 (4)
O23	0.1596 (16)	1.1040 (14)	0.8914 (10)	0.006 (2)
O24	0.063 (2)	1.243 (2)	0.7299 (13)	0.003 (4)
O25	0.4561 (16)	1.0477 (13)	0.8873 (9)	0.006 (2)
O26	0.2568 (17)	0.8508 (14)	0.8791 (10)	0.005 (2)

Table S2. Selected Interatomic Distances (Å) and Angles (deg) for PbLnB₇O₁₃ (Ln=Tb, Eu).

PbTbB ₇ O ₁₃			
Pb1—O14	2.298 (18)	B5—O15	1.45 (4)
Pb1—O4	2.354 (17)	B6—O15	1.40 (4)
Pb1—O7	2.50 (2)	B6—O16	1.46 (4)
Pb1—O12	2.58 (2)	B6—O17	1.28 (4)
Pb1—O3	2.85 (2)	B7—O6	1.46 (4)
Pb2—O4	2.366 (18)	B7—O5	1.44 (4)
Pb2—O14	2.36 (3)	B7—O7	1.45 (4)
Pb2—O23	2.407 (18)	B7—O10	1.48 (4)
Pb2—O9 ⁱ	2.62 (2)	B8—O16	1.32 (4)
Pb2—O17	2.78 (2)	B8—O18	1.57 (4)
Tb1—O19	2.309 (15)	B8—O19	1.52 (4)
Tb1—O21 ⁱⁱ	2.312 (17)	B8—O26 ^v	1.48 (4)
Tb1—O6 ⁱⁱⁱ	2.321 (17)	B9—O17	1.42 (4)
Tb1—O11 ^{iv}	2.343 (17)	B9—O18	1.50 (4)
Tb1—O25 ^v	2.352 (16)	B9—O20	1.52 (4)
Tb1—O22 ⁱⁱ	2.357 (15)	B9—O22	1.48 (4)
Tb2—O26	2.302 (16)	B10—O20	1.52 (4)
Tb2—O20 ^{vi}	2.309 (17)	B10—O21	1.47 (4)
Tb2—O5 ^{vii}	2.321 (16)	B10—O1 ^{ix}	1.58 (4)
Tb2—O24	2.326 (17)	B10—O11 ^x	1.47 (4)
Tb2—O10 ^{iv}	2.333 (16)	B11—O26	1.42 (4)
Tb2—O18	2.356 (15)	B11—O21 ^{xiv}	1.48 (3)
B1—O1	1.25 (4)	B11—O6 ^{iv}	1.50 (4)
B1—O2	1.38 (3)	B11—O3 ^{iv}	1.44 (4)
B1—O3	1.42 (4)	B12—O22	1.46 (4)
B2—O2	1.32 (3)	B12—O23	1.57 (4)
B2—O4	1.39 (3)	B12—O24	1.51 (4)
B2—O8 ⁱ	1.41 (4)	B12—O25	1.42 (4)
B3—O7	1.44 (4)	B13—O19 ^{xiii}	1.49 (4)
B3—O8	1.42 (3)	B13—O5 ⁱ	1.42 (4)
B3—O9	1.27 (4)	B13—O9 ⁱ	1.44 (4)

B4—O12	1.40 (4)	B13—O25	1.49 (4)
B4—O13	1.319 (7)	B14—O10	1.47 (4)
B4—O23 ^x	1.32 (4)	B14—O12	1.46 (4)
B5—O13	1.36 (4)	B14—O11	1.49 (4)
B5—O14	1.33 (3)	B14—O24 ^x	1.52 (4)
O1—B1—O2	116 (3)	O17—B9—O20	113 (3)
O1—B1—O3	125 (3)	O22—B9—O20	107 (2)
O2—B1—O3	119 (3)	O18—B9—O20	104 (2)
O2—B2—O4	127 (3)	O21—B10—O11 ^x	113 (2)
O2—B2—O8 ⁱ	114 (2)	O21—B10—O20	107 (2)
O4—B2—O8 ⁱ	118 (2)	O11 ^x —B10—O20	107 (2)
O9—B3—O8	127 (3)	O21—B10—O1 ^{ix}	111 (2)
O9—B3—O7	118 (2)	O11 ^x —B10—O1 ^{ix}	109 (2)
O8—B3—O7	114 (2)	O20—B10—O1 ^{ix}	109 (2)
O13—B4—O23 ^x	118 (3)	O26—B11—O3 ⁱⁱⁱ	113 (3)
O13—B4—O12	119 (2)	O26—B11—O21 ^{xiv}	109 (2)
O23 ^x —B4—O12	123.3 (18)	O3 ⁱⁱⁱ —B11—O21 ^{xiv}	111 (3)
O14—B5—O13	132 (3)	O26—B11—O6 ⁱⁱⁱ	108 (2)
O14—B5—O15	121 (2)	O3 ⁱⁱⁱ —B11—O6 ⁱⁱⁱ	110 (3)
O13—B5—O15	107 (2)	O21 ^{xiv} —B11—O6 ⁱⁱⁱ	106 (2)
O17—B6—O15	122 (3)	O25—B12—O22	111 (3)
O17—B6—O16	123 (3)	O25—B12—O24	109 (3)
O15—B6—O16	115 (3)	O22—B12—O24	110 (2)
O5—B7—O6	113 (3)	O25—B12—O23	111 (3)
O5—B7—O10	110 (3)	O22—B12—O23	108 (3)
O6—B7—O10	105 (3)	O24—B12—O23	108 (3)
O5—B7—O7	108 (3)	O5 ⁱ —B13—O9 ⁱ	110 (3)
O6—B7—O7	112 (3)	O5 ⁱ —B13—O25	109 (2)
O10—B7—O7	108 (3)	O9 ⁱ —B13—O25	110 (3)
O16—B8—O26 ^v	114 (3)	O5 ⁱ —B13—O19 ^{xiii}	112 (3)
O16—B8—O19	116 (3)	O9 ⁱ —B13—O19 ^{xiii}	109 (3)
O26 ^v —B8—O19	107 (2)	O25—B13—O19 ^{xiii}	107 (2)
O16—B8—O18	113 (3)	O12—B14—O10	112 (3)
O26 ^v —B8—O18	103 (2)	O12—B14—O11	113 (2)
O19—B8—O18	102 (2)	O10—B14—O11	106 (2)
O17—B9—O22	110 (3)	O12—B14—O24 ^x	113 (3)
O17—B9—O18	114 (3)	O10—B14—O24 ^x	107 (2)
O22—B9—O18	108 (2)	O11—B14—O24 ^x	105 (2)
Symmetry codes: (i) $-x+1, y-1/2, -z+1$; (ii) $x-1, y, z$; (iii) $x, y, z+1$; (iv) $x-1, y, z+1$; (v) $-x, y+1/2, -z+2$; (vi) $-x, y-1/2, -z+2$; (vii) $-x, y-1/2, -z+1$; (viii) $x, y, z-1$; (ix) $-x+1, y+1/2, -z+1$; (x) $-x, y+1/2, -z+1$; (xi) $x+1, y, z-1$; (xii) $-x+1, y+1/2, -z+2$; (xiii) $x+1, y, z$; (xiv) $-x+1, y-1/2, -z+2$.			

PbEuB ₇ O ₁₃			
Pb1—O20	2.316 (17)	B6—O22	1.39 (4)
Pb1—O19	2.410 (18)	B6—O24	1.40 (4)
Pb1—O22	2.45 (2)	B7—O9	1.36 (3)
Pb1—O14i	2.69 (2)	B7—O10	1.49 (3)
Pb1—O5ii	2.82 (2)	B7—O11	1.50 (3)
Pb2—O19	2.327 (19)	B7—O12	1.51 (3)
Pb2—O20	2.377 (16)	B7—Eu2ix	3.30 (3)
Pb2—O17	2.416 (18)	B8—O13	1.41 (3)
Pb2—O24ii	2.512 (18)	B8—O7	1.48 (3)
Pb2—O9xiii	2.511 (18)	B8—O12	1.51 (3)
Eu1—O11	2.344 (11)	B8—O8	1.51 (3)
Eu1—O25iii	2.365 (12)	B9—O4	1.44 (3)
Eu1—O3iv	2.372 (13)	B9—O26ii	1.46 (3)
Eu1—O26v	2.372 (13)	B9—O8	1.50 (3)
Eu1—O13	2.375 (12)	B9—O5	1.53 (3)
Eu1—O10vi	2.394 (13)	B10—O2	1.44 (3)
Eu2—O16ix	2.334 (12)	B10—O11x	1.45 (3)
Eu2—O12iv	2.342 (12)	B10—O4	1.49 (3)
Eu2—O8	2.363 (12)	B10—O3	1.53 (3)
Eu2—O4iv	2.369 (12)	B10—Eu1x	3.29 (3)
Eu2—O15	2.369 (12)	B10—Eu2ix	3.30 (3)
Eu2—O23ii	2.389 (13)	B11—O14	1.36 (3)
B1—O5	1.28 (3)	B11—O25v	1.48 (3)
B1—O6	1.32 (3)	B11—O13	1.48 (3)
B1—O7	1.39 (3)	B11—O15	1.53 (3)
B2—O2	1.30 (3)	B12—O15	1.43 (3)
B2—O1	1.40 (3)	B12—O10xiii	1.46 (3)
B2—O9x	1.45 (3)	B12—O16	1.48 (3)
B3—O14	1.31 (3)	B12—O17	1.53 (3)
B3—O17	1.35 (4)	B13—O22	1.45 (3)
B3—O18	1.39 (3)	B13—O26	1.46 (3)
B4—O20	1.34 (3)	B13—O25	1.46 (3)
B4—O1xi	1.40 (3)	B13—O23	1.55 (3)
B4—O18i	1.48 (3)	B14—O16xii	1.42 (3)
B5—O21	1.32 (3)	B14—O3xiv	1.46 (3)
B5—O19xii	1.34 (3)	B14—O23	1.47 (3)
B5—O6xiii	1.39 (3)	B14—O24	1.56 (3)
B6—O21	1.33 (4)		
O5—B1—O6	122 (3)	O4—B9—O5	113 (2)
O5—B1—O7	120 (2)	O26 ⁱⁱ —B9—O5	109 (2)
O6—B1—O7	117 (2)	O8—B9—O5	108 (2)

O2—B2—O1	117 (2)	O2—B10—O11 ^x	113 (2)
O2—B2—O9 ^x	125 (2)	O2—B10—O4	111 (2)
O1—B2—O9 ^x	117 (2)	O11 ^x —B10—O4	108.6 (19)
O14—B3—O17	121 (3)	O2—B10—O3	112 (2)
O14—B3—O18	124 (3)	O11 ^x —B10—O3	107.2 (19)
O17—B3—O18	114 (2)	O4—B10—O3	104.0 (17)
O20—B4—O1 ^{xi}	131 (2)	O14—B11—O25 ^v	118 (2)
O20—B4—O18 ⁱ	126 (2)	O14—B11—O13	112 (2)
O1 ^{xi} —B4—O18 ⁱ	104 (2)	O25 ^v —B11—O13	106.3 (19)
O21—B5—O19 ^{xii}	121 (2)	O14—B11—O15	109 (2)
O21—B5—O6 ^{xiii}	118 (2)	O25 ^v —B11—O15	103.9 (18)
O19 ^{xii} —B5—O6 ^{xiii}	121 (2)	O13—B11—O15	106.1 (19)
O21—B6—O22	117 (3)	O15—B12—O10 ^{xiii}	113.1 (19)
O21—B6—O24	122 (3)	O15—B12—O16	112 (2)
O22—B6—O24	121 (3)	O10 ^{xiii} —B12—O16	105.9 (19)
O9—B7—O10	113 (2)	O15—B12—O17	109.4 (19)
O9—B7—O11	115 (2)	O10 ^{xiii} —B12—O17	109.4 (19)
O10—B7—O11	104.6 (19)	O16—B12—O17	106.8 (18)
O9—B7—O12	113 (2)	O22—B13—O26	115 (2)
O10—B7—O12	106 (2)	O22—B13—O25	113 (2)
O11—B7—O12	105.2 (19)	O26—B13—O25	107.8 (19)
O13—B8—O7	113 (2)	O22—B13—O23	108.2 (19)
O13—B8—O12	111.4 (19)	O26—B13—O23	108.6 (18)
O7—B8—O12	110.7 (18)	O25—B13—O23	104.3 (18)
O13—B8—O8	110.6 (18)	O16 ^{xii} —B14—O3 ^{xiv}	110 (2)
O7—B8—O8	108 (2)	O16 ^{xii} —B14—O23	112.8 (19)
O12—B8—O8	103.4 (18)	O3 ^{xiv} —B14—O23	109.8 (19)
O4—B9—O26 ⁱⁱ	110 (2)	O16 ^{xii} —B14—O24	105.7 (19)
O4—B9—O8	107.7 (19)	O3 ^{xiv} —B14—O24	110.5 (19)
O26 ⁱⁱ —B9—O8	110 (2)	O23—B14—O24	108 (2)
Symmetry codes: (i) $-x+1, y+1/2, -z+1$; (ii) $-x, y-1/2, -z+1$; (iii) $x, y-1, z-1$; (iv) $-x, y+1/2, -z$; (v) $-x+1, y-1/2, -z+1$; (vi) $-x+1, y+1/2, -z$; (vii) $-x+1, y-1/2, -z$; (viii) $x+1, y, z$; (ix) $-x, y-1/2, -z$; (x) $x-1, y, z$; (xi) $x+1, y+1, z$; (xii) $-x, y+1/2, -z+1$; (xiii) $x, y+1, z$; (xiv) $-x, y+3/2, -z+1$; (xv) $x, y+1, z+1$; (xvi) $x-1, y-1, z$; (xvii) $-x, y-3/2, -z+1$; (xviii) $x, y-1, z$.			

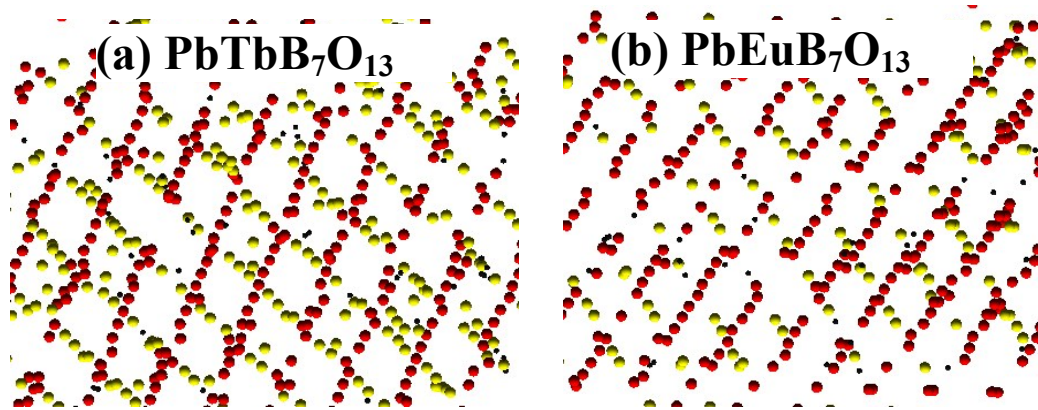


Figure S1. Reciprocal lattice of $\text{PbTbB}_7\text{O}_{13}$ (a) and $\text{PbEuB}_7\text{O}_{13}$ (b) constructed by experimental data.

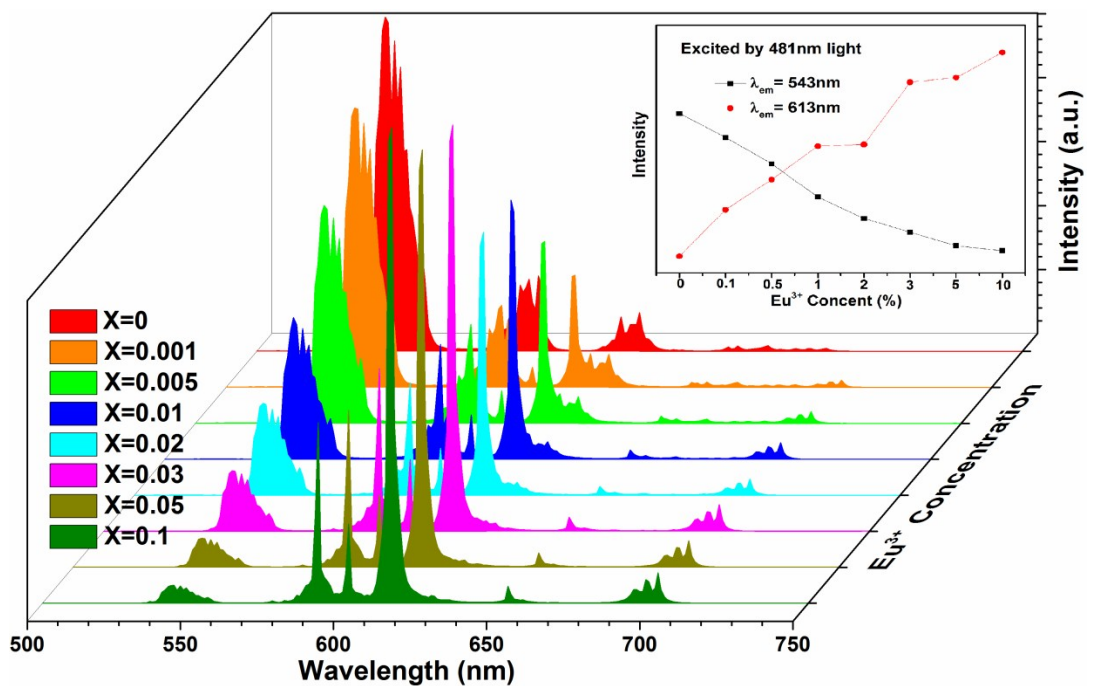


Figure S2. PL spectra of representative $\text{PbTb}_{1-x}\text{Eu}_x\text{B}_7\text{O}_{13}$ ($x=0\sim 0.1$) phosphors excited by 481 nm (${}^7\text{F}_6 \rightarrow {}^5\text{D}_4$ of Tb^{3+}) as a function of Eu^{3+} doping content x . Inset is the variation of 543 nm (${}^5\text{D}_4 \rightarrow {}^7\text{F}_5$ of Tb^{3+}) and 613 nm (${}^7\text{F}_0 \rightarrow {}^5\text{D}_2$ of Eu^{3+}) emission intensity.

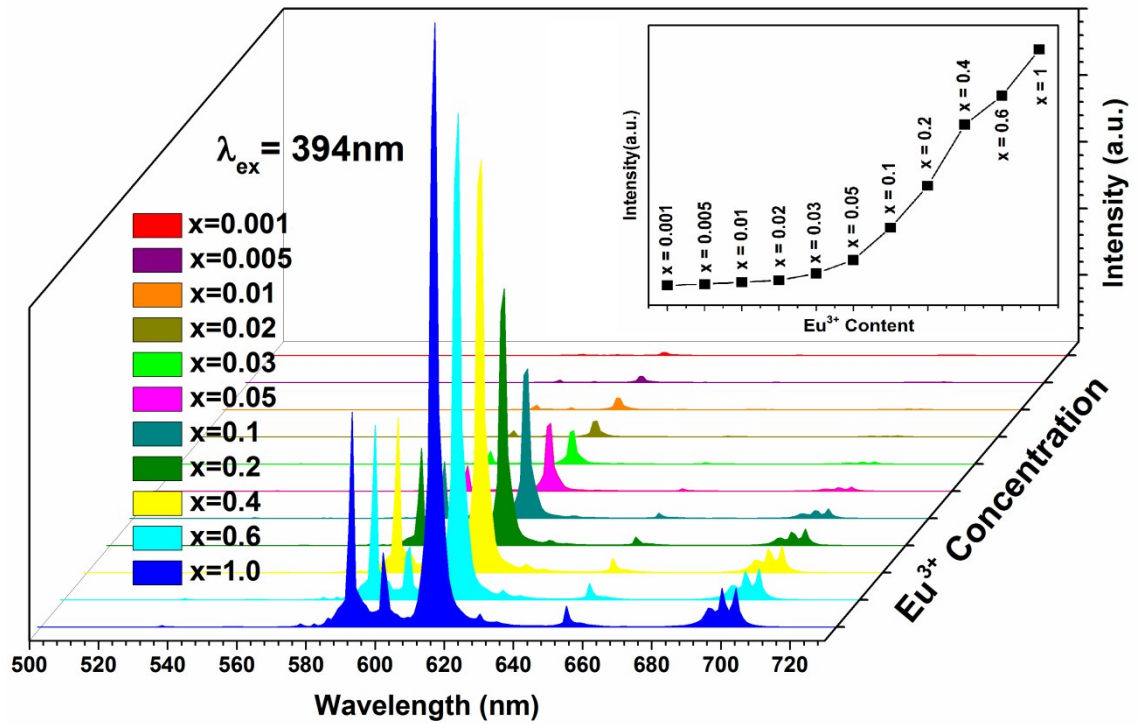


Figure S3. PL spectra of representative $\text{PbTb}_{1-x}\text{Eu}_x\text{B}_7\text{O}_{13}$ ($x=0.001\sim 1$) phosphors excited by 394 nm (${}^7\text{F}_0\rightarrow{}^5\text{L}_6$ of Eu^{3+}) as a function of Eu^{3+} doping content x . Inset is the variation of 613 nm (${}^7\text{D}_0\rightarrow{}^7\text{F}_2$ of Eu^{3+}) emission intensity.