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**Supporting information for article:**

# New red phosphor Na3EuB8O15 with an open-window tubular structure

**Wen-Yan Bi, Wei Wang and Rui-Juan Zhang**

**Table S1** The atomic sites of compound $Na_3EuB_8O_{15}$.

| $Na_3EuB_8O_{15}$ | *x* | *y* | *z* | $U_{iso}$*/$U_{eq}$ |
|---|---|---|---|---|
| Na1 | 0.3660 (3) | 0.6133 (3) | 0.27065 (15) | 0.0243 (7) |
| Na2 | 0.9077 (3) | 0.6895 (2) | 0.39135 (13) | 0.0214 (7) |
| Na3 | 0.7491 (3) | 0.2624 (3) | 0.02311 (13) | 0.0207 (7) |
| Eu1 | 0.91847 (3) | 0.24943 (3) | 0.332664 (13) | 0.00529 (8) |
| B1 | 0.6192 (8) | 0.3642 (6) | 0.5005 (3) | 0.0086 (15) |
| B2 | 0.2732 (7) | 0.0580 (6) | 0.4860 (3) | 0.0067 (14) |
| B3 | 0.3874 (7) | 0.2019 (6) | 0.3270 (3) | 0.0066 (14) |
| B4 | 0.3722 (8) | −0.0168 (6) | 0.1855 (3) | 0.0081 (14) |
| B5 | 0.1055 (7) | 0.1531 (6) | 0.1590 (3) | 0.0067 (14) |
| B6 | 0.3156 (7) | 0.1295 (6) | −0.1430 (3) | 0.0056 (14) |
| B7 | 0.2055 (7) | 0.2815 (6) | −0.0107 (3) | 0.0065 (14) |
| B8 | 0.1643 (7) | 0.3893 (6) | −0.1803 (3) | 0.0064 (14) |
| O1 | 0.8032 (5) | 0.5062 (4) | 0.5592 (2) | 0.0133 (10) |
| O2 | 0.5907 (4) | 0.3551 (4) | 0.39509 (18) | 0.0064 (9) |
| O3 | 0.4513 (5) | 0.2227 (4) | 0.54496 (19) | 0.0103 (10) |
| O4 | 0.1594 (5) | −0.1015 (4) | 0.5276 (2) | 0.0106 (10) |
| O5 | 0.2177 (4) | 0.0699 (4) | 0.38316 (19) | 0.0087 (9) |
| O6 | 0.2549 (4) | 0.2787 (3) | 0.25275 (18) | 0.0053 (9) |
| O7 | 0.4978 (4) | 0.0948 (4) | 0.27469 (19) | 0.0076 (9) |
| O8 | 0.1690 (4) | −0.0077 (4) | 0.13792 (19) | 0.0068 (9) |
| O9 | 0.1261 (4) | 0.2790 (4) | 0.07613 (19) | 0.0074 (9) |
| O10 | 0.1450 (4) | −0.0744 (3) | −0.17357 (19) | 0.0067 (9) |
| O11 | 0.5573 (4) | 0.1477 (4) | −0.1470 (2) | 0.0078 (9) |
| O12 | 0.3253 (4) | 0.1796 (4) | −0.03549 (19) | 0.0065 (9) |
| O13 | 0.1627 (5) | 0.4130 (4) | −0.07702 (19) | 0.0092 (10) |

| | | | | |
|---|---|---|---|---|
| O14 | 0.0747 (5) | 0.4852 (4) | −0.2456 (2) | 0.0109 (10) |
| O15 | 0.2623 (4) | 0.2665 (4) | −0.21011 (19) | 0.0071 (9) |

**Table S2** Thermal parameters of compound $Na_3EuB_8O_{15}$.

| | $U^{11}$ | $U^{22}$ | $U^{33}$ | $U^{12}$ | $U^{13}$ | $U^{23}$ |
|---|---|---|---|---|---|---|
| Na1 | 0.0227 (10) | 0.0150 (9) | 0.0407 (12) | 0.0082 (8) | 0.0176 (9) | 0.0116 (8) |
| Na2 | 0.0278 (10) | 0.0186 (9) | 0.0141 (9) | 0.0072 (8) | 0.0012 (7) | −0.0039 (7) |
| Na3 | 0.0160 (9) | 0.0255 (9) | 0.0212 (9) | 0.0132 (8) | −0.0052 (7) | −0.0077 (7) |
| Eu1 | 0.00539 (11) | 0.00622 (11) | 0.00415 (11) | 0.00224 (7) | 0.00095 (7) | 0.00039 (6) |
| B1 | 0.010 (2) | 0.009 (2) | 0.010 (2) | 0.0062 (17) | 0.0029 (16) | 0.0005 (16) |
| B2 | 0.0066 (19) | 0.010 (2) | 0.0059 (19) | 0.0065 (16) | 0.0011 (15) | −0.0007 (15) |
| B3 | 0.0032 (18) | 0.0054 (18) | 0.009 (2) | 0.0007 (15) | −0.0012 (15) | −0.0029 (15) |
| B4 | 0.009 (2) | 0.0055 (19) | 0.011 (2) | 0.0027 (16) | 0.0051 (16) | 0.0023 (15) |
| B5 | 0.0079 (19) | 0.0081 (19) | 0.0059 (19) | 0.0048 (16) | 0.0023 (15) | −0.0008 (15) |
| B6 | 0.0058 (19) | 0.0050 (18) | 0.0065 (19) | 0.0030 (15) | 0.0003 (15) | −0.0011 (15) |
| B7 | 0.0049 (19) | 0.0067 (19) | 0.0070 (19) | 0.0012 (15) | 0.0015 (15) | −0.0003 (15) |
| B8 | 0.0043 (18) | 0.0056 (19) | 0.008 (2) | 0.0005 (15) | 0.0012 (15) | 0.0023 (15) |
| O1 | 0.0112 (14) | 0.0123 (14) | 0.0114 (14) | 0.0012 (11) | −0.0007 (11) | −0.0038 (11) |
| O2 | 0.0059 (12) | 0.0076 (12) | 0.0041 (12) | 0.0014 (10) | 0.0004 (10) | −0.0003 (10) |
| O3 | 0.0103 (13) | 0.0103 (13) | 0.0050 (13) | −0.0009 (11) | 0.0010 (10) | 0.0001 (10) |
| O4 | 0.0108 (13) | 0.0096 (13) | 0.0106 (14) | 0.0025 (11) | 0.0041 (11) | 0.0045 (11) |
| O5 | 0.0080 (13) | 0.0103 (13) | 0.0051 (12) | 0.0014 (10) | 0.0006 (10) | 0.0010 (10) |
| O6 | 0.0059 (12) | 0.0065 (12) | 0.0040 (12) | 0.0035 (10) | 0.0002 (10) | −0.0008 (9) |
| O7 | 0.0048 (12) | 0.0119 (13) | 0.0073 (13) | 0.0058 (10) | −0.0011 (10) | −0.0036 (10) |
| O8 | 0.0051 (12) | 0.0105 (13) | 0.0074 (13) | 0.0066 (10) | −0.0003 (10) | −0.0010 (10) |
| O9 | 0.0111 (13) | 0.0097 (13) | 0.0038 (12) | 0.0067 (11) | 0.0013 (10) | 0.0015 (10) |
| O10 | 0.0048 (12) | 0.0065 (12) | 0.0087 (13) | 0.0017 (10) | 0.0024 (10) | −0.0008 (10) |
| O11 | 0.0039 (12) | 0.0082 (13) | 0.0118 (13) | 0.0029 (10) | 0.0021 (10) | −0.0023 (10) |

| | | | | | | |
|---|---|---|---|---|---|---|
| O12 | 0.0066 (12) | 0.0096 (13) | 0.0045 (12) | 0.0052 (10) | −0.0004 (10) | 0.0000 (10) |
| O13 | 0.0154 (14) | 0.0106 (13) | 0.0066 (13) | 0.0096 (11) | 0.0036 (11) | 0.0025 (10) |
| O14 | 0.0154 (14) | 0.0143 (14) | 0.0096 (13) | 0.0114 (12) | 0.0058 (11) | 0.0054 (11) |
| O15 | 0.0099 (13) | 0.0096 (13) | 0.0054 (12) | 0.0068 (11) | 0.0037 (10) | 0.0032 (10) |

**Table S3** Selected bond distances (Å) and angles ( º ) for $Na_3EuB_8O_{15}$.

| | | | |
|---|---|---|---|
| Na1—O1$^{i}$ | 2.719 (4) | B1—O1 | 1.330 (4) |
| Na1—O3$^{i}$ | 2.606 (3) | B1—O2 | 1.398 (5) |
| Na1—O6 | 2.329 (3) | B1—O3 | 1.400 (5) |
| Na1—O11$^{ii}$ | 2.434 (3) | B2—O3 | 1.404 (4) |
| Na1—O14$^{iii}$ | 2.520 (3) | B2—O4 | 1.322 (5) |
| Na1—O15$^{ii}$ | 2.446 (3) | B2—O5 | 1.381 (5) |
| Na2—O1 | 2.713 (3) | B3—O2 | 1.477 (4) |
| Na2—O1$^{iv}$ | 2.762 (4) | B3—O5 | 1.473 (5) |
| Na2—O2 | 2.522 (3) | B3—O6 | 1.455 (5) |
| Na2—O3$^{i}$ | 2.858 (4) | B3—O7 | 1.499 (6) |
| Na2—O4$^{v}$ | 2.291 (3) | B4—O7 | 1.371 (4) |
| Na2—O5$^{v}$ | 2.768 (3) | B4—O8 | 1.347 (6) |
| Na2—O14$^{ii}$ | 2.400 (4) | B4—O11$^{vi}$ | 1.365 (6) |
| Na2—O15$^{ii}$ | 2.562 (3) | B5—O6 | 1.486 (4) |
| Na3—O9$^{vii}$ | 2.297 (3) | B5—O8 | 1.460 (6) |
| Na3—O10$^{vi}$ | 2.623 (3) | B5—O9 | 1.464 (5) |
| Na3—O11 | 2.362 (3) | B5—O10$^{ix}$ | 1.498 (5) |
| Na3—O12 | 2.449 (3) | B6—O10 | 1.481 (4) |
| Na3—O13$^{vii}$ | 2.975 (3) | B6—O11 | 1.481 (6) |
| Na3—O13$^{ii}$ | 2.358 (3) | B6—O12 | 1.479 (5) |
| Eu1—O1$^{iv}$ | 2.240 (2) | B6—O15 | 1.477 (5) |
| Eu1—O2 | 2.744 (3) | B7—O9 | 1.353 (5) |
| Eu1—O4$^{viii}$ | 2.232 (3) | B7—O12 | 1.349 (6) |

| | | | |
|---|---|---|---|
| Eu1—O5$^{vii}$ | 2.721 (3) | B7—O13 | 1.413 (5) |
| Eu1—O6$^{vii}$ | 2.482 (3) | B8—O13 | 1.406 (5) |
| Eu1—O7 | 2.393 (2) | B8—O14 | 1.330 (6) |
| Eu1—O10$^{vi}$ | 2.392 (3) | B8—O15 | 1.391 (6) |
| Eu1—O14$^{ii}$ | 2.319 (3) | | |
| | | | |
| O1—B1—O2 | 120.9 (3) | O6—B5—O10$^{ix}$ | 106.6 (3) |
| O1—B1—O3 | 119.4 (4) | O8—B5—O9 | 111.7 (3) |
| O2—B1—O3 | 119.7 (3) | O8—B5—O10$^{ix}$ | 109.5 (3) |
| O3—B2—O4 | 121.3 (3) | O9—B5—O10$^{ix}$ | 108.6 (3) |
| O3—B2—O5 | 117.5 (3) | O10—B6—O11 | 109.3 (4) |
| O4—B2—O5 | 121.1 (3) | O10—B6—O12 | 109.5 (3) |
| O2—B3—O5 | 112.0 (3) | O10—B6—O15 | 112.3 (3) |
| O2—B3—O6 | 113.1 (3) | O11—B6—O12 | 105.2 (3) |
| O2—B3—O7 | 104.1 (3) | O11—B6—O15 | 107.9 (3) |
| O5—B3—O6 | 106.9 (3) | O12—B6—O15 | 112.4 (4) |
| O5—B3—O7 | 110.6 (3) | O9—B7—O12 | 126.5 (4) |
| O6—B3—O7 | 110.1 (3) | O9—B7—O13 | 113.9 (4) |
| O7—B4—O8 | 120.4 (4) | O12—B7—O13 | 119.5 (4) |
| O7—B4—O11$^{vi}$ | 120.5 (4) | O13—B8—O14 | 119.3 (4) |
| O8—B4—O11$^{vi}$ | 119.0 (3) | O13—B8—O15 | 118.3 (4) |
| O6—B5—O8 | 113.2 (3) | O14—B8—O15 | 122.4 (4) |
| O6—B5—O9 | 107.0 (3) | | |

Symmetry codes: (i) −*x*+1, −*y*+1, −*z*+1; (ii) −*x*+1, −*y*+1, −*z*; (iii) −*x*, −*y*+1, −*z*; (iv) −*x*+2, −*y*+1, −*z*+1; (v) *x*+1, *y*+1, *z*; (vi) −*x*+1, −*y*, −*z*; (vii) *x*+1, *y*, *z*; (viii) −*x*+1, −*y*, −*z*+1; (ix) −*x*, −*y*, −*z*.

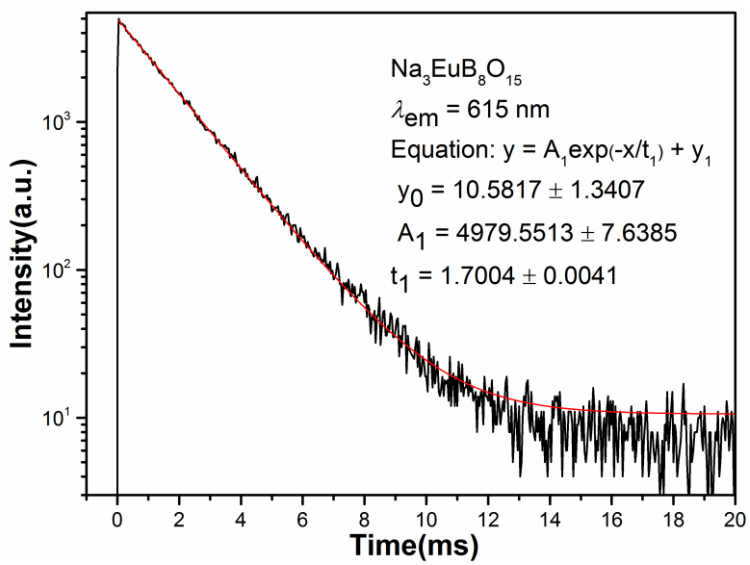


**Figure S1** Fluorescent decay (black) and fitting (red) curves (logarithmic scale) of $Na_3EuB_8O_{15}$ under 393 nm light excitation and monitoring 615 nm emission.