# Electronic supplementary information

# Luminescence Properties of $La_2W_{2-x}Mo_xO_9$ (x = 0 – 2):$Eu^{3+}$ and their Judd–Ofelt analysis: A Novel red line emitting phosphors for pcLEDs

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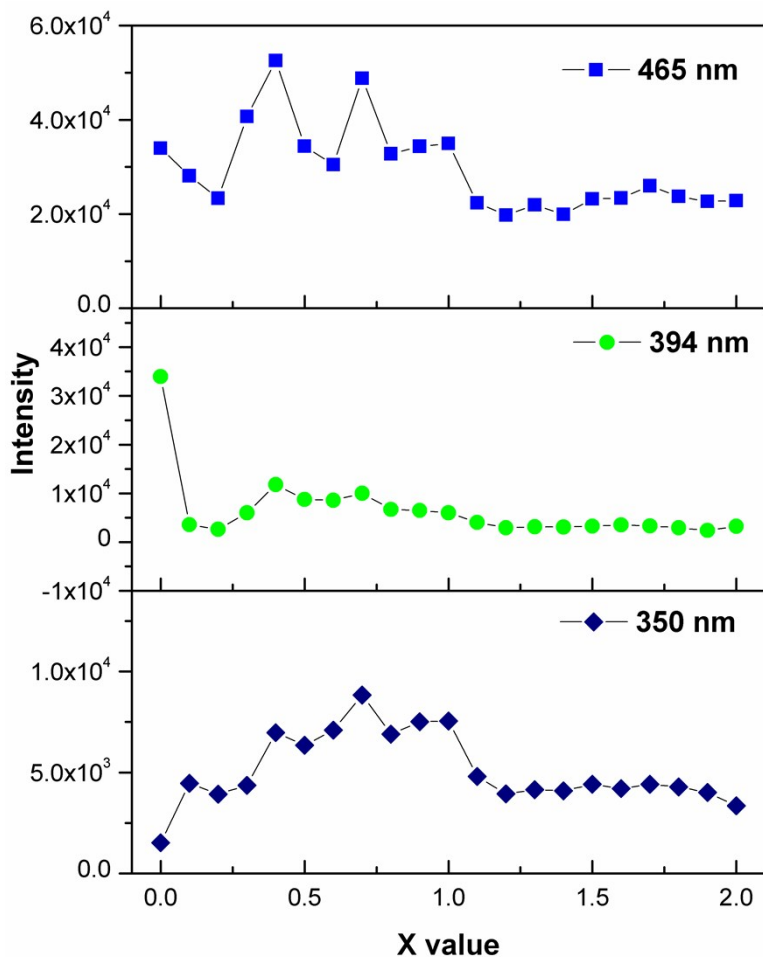Fig S1. The variation of electric dipole emission intensity of $Eu^{3+}$ vs x value (increase of Mo concentration)

Table.ST1. Comparison of emission intensity ($^5D_0 \rightarrow {}^7F_2$) of the $La_{0.95}Eu_{0.05}W_{2-x}Mo_xO_9$ ( x = 0 – 2 instep of 0.1 )

| Compositions | Relative Intensity (a.u) | | CIE chromaticity coordinates | |
| --- | --- | --- | --- | --- |
| | $\lambda_{exc}$ = 394 nm | $\lambda_{exc}$ = 465 nm | | |
| $Y_2O_2S:Eu^{3+}$ (Nichia) | 1 | 1 | $\lambda_{exc}$ = 465 nm | |
| $La_{0.95}Eu_{0.05}W_{2-x}Mo_xO_9$ ( x = 0 – 2 instep of 0.1 ) | | | x | y |
| **0** | **0.54** | 3.18 | 0.6490 | 0.3487 |
| 0.1 | 0.08 | 2.64 | 0.6472 | 0.3503 |
| 0.2 | 0.05 | 2.18 | 0.6478 | 0.3498 |
| 0.3 | 0.13 | 3.80 | 0.6468 | 0.3507 |
| **0.4** | **0.24** | **4.92** | **0.6482** | **0.3495** |
| 0.5 | 0.18 | 3.21 | 0.6480 | 0.3497 |
| 0.6 | 0.18 | 2.84 | 0.6491 | 0.3488 |
| 0.7 | 0.2 | 4.6 | 0.6476 | 0.3501 |
| 0.8 | 0.14 | 3.06 | 0.6469 | 0.3508 |
| 0.9 | 0.13 | 3.21 | 0.6455 | 0.3521 |
| 1 | 0.12 | 3.27 | 0.6469 | 0.3538 |
| 1.1 | 0.08 | 2.10 | 0.6432 | 0.3537 |
| 1.2 | 0.06 | 1.84 | 0.6491 | 0.3486 |
| 1.4 | 0.06 | 1.86 | 0.6516 | 0.3565 |
| 1.5 | 0.07 | 2.17 | 0.6468 | 0.3505 |
| 1.6 | 0.07 | 2.18 | 0.6454 | 0.3518 |
| 1.7 | 0.07 | 2.43 | 0.6511 | 0.3469 |
| 1.8 | 0.07 | 2.22 | 0.6458 | 0.3515 |

| 1.9 | 0.06 | 2.12 | 0.6461 | 0.3512 |
|-----|------|------|--------|--------|
| 2 | 0.07 | 2.13 | 0.6469 | 0.350 |

Table. ST2. Comparison of emission intensity ($^5D_0$ - $^7F_2$) of the $La_{2-y}Eu_yW_{1.6}Mo_{0.4}O_9$ (y = 0 – 2 instep of 0.2)

| Compositions | Relative Intensity (a.u) | | CIE chromaticity coordinates | | Asymmetric ratio |
|---|---|---|---|---|---|
| | $\lambda_{exc} = 394$ nm | $\lambda_{exc} = 465$ nm | | | $^5D_0 - {}^7F_2/$ $^5D_0 - {}^7F_1$ |
| $Y_2O_2S:Eu^{3+}$ (Nichia) | 1 | 1 | $\lambda_{exc} = 465$ nm | | |
| $La_{2-y}Eu_yW_{1.6}Mo_{0.4}O_9$ (y = 0 – 2 instep of 0.2) | | | x | y | |
| 0.05 | 0.24 | 4.92 | | | |
| 0.2 | 0.16 | 2.42 | 0.668 | 0.3318 | 5.4 |
| 0.4 | 0.48 | 4.92 | 0.668 | 0.3317 | 5.8 |
| 0.6 | 0.63 | 6.04 | 0.6688 | 0.331 | 5.8 |
| 0.8 | 1.34 | 7.96 | 0.6688 | 0.3309 | 5.9 |
| 1 | 1 | 7.54 | 0.6691 | 0.3307 | 6.0 |
| 1.2 | 0.71 | 6.60 | 0.6692 | 0.3305 | 6.2 |
| **1.4** | **1.26** | **8.24** | 0.6704 | 0.3294 | 6.5 |
| 1.6 | 1.54 | 7.61 | 0.6713 | 0.3285 | 6.6 |
| **1.8** | **1.71** | **6.63** | 0.6725 | 0.3273 | 6.9 |
| 2 | 1.32 | 4.47 | 0.6724 | 0.3274 | 7.0 |