Supporting Information

$K_2Ln(PO_4)(WO_4):Tb^{3+},Eu^{3+}$ (Ln = Y, Gd and Lu) Phosphors: Highly Efficient Pure Red and Tuneable Emission for White Light-Emitting Diodes

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Refinement Conditions:

Background function: 12-coefficients polynomial function

Peak profile function: Thompson-Cox-Hastings pseudo-Voigt with Axial divergence asymmetry

Cycles of refinement: 50

Table S1. Cell and atomic coordinate parameters of $K_2Tb_{0.5}Eu_{0.5}(PO_4)(WO_4)$. a=6.968Å, b=12.285 Å, c=19.757Å, V=1691.24Å^3

Atom	Wyck.	x/a	y/b	z/c
W1	8e	0.500(0)	0.250(0)	0.333(8)
Tb/Eu	8d	0.750(0)	0.324(9)	0.500(0)
K1	16f	0.970(0)	0.069(7)	0.344(2)
P1	8d	0.750(0)	0.071(0)	0.500(0)
O1	16f	0.770(2)	0.302(7)	0.385(4)
O2	16f	0.442(3)	0.364(3)	0.284(6)
O3	16f	0.731(2)	-0.005(0)	0.438(1)
O4	16f	0.922(9)	0.142(2)	0.492(5)

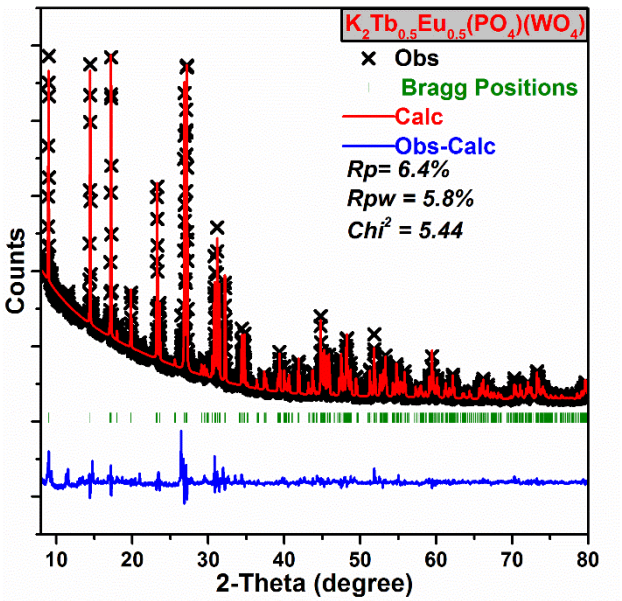

Figure S1. The calculated, observed XRD patterns and residual curves of $K_2Tb_{0.5}Eu_{0.5}(PO_4)(WO_4)$.

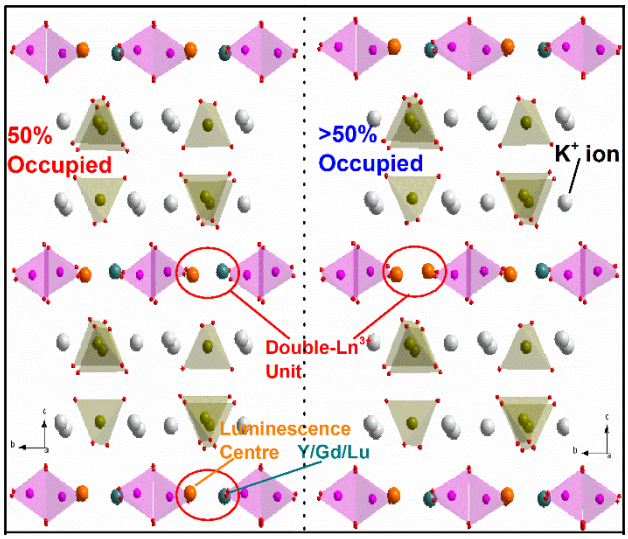

Figure S2. Ln^{3+} site occupation when the concentration is 50% and > 50%.

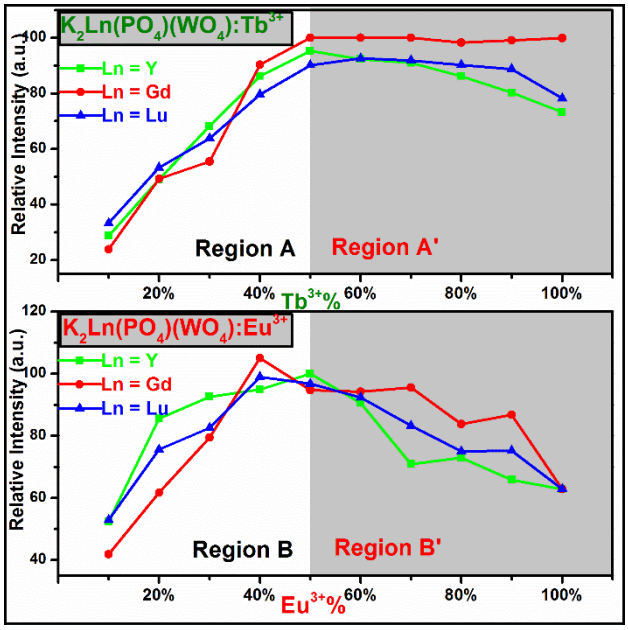

Figure S3. The emission intensity as a function of Tb^{3+} or Eu^{3+} content in $K_2Ln(PO_4)(WO_4)$.

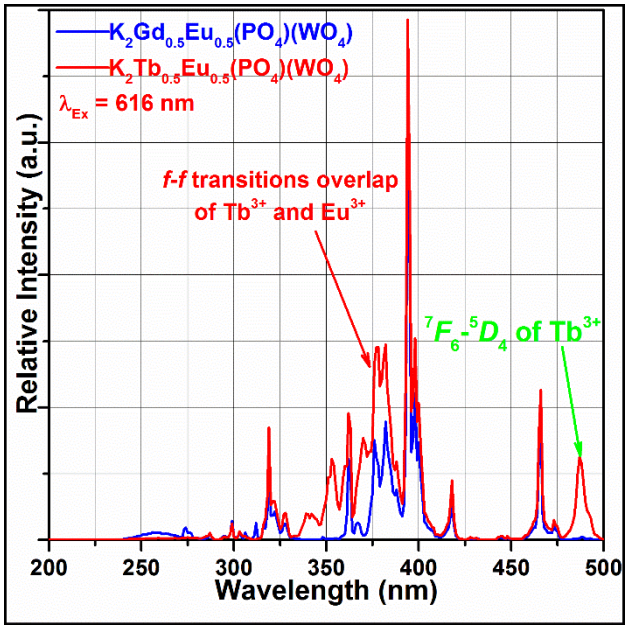

Figure S4. PLE of $K_2Tb_{0.5}Eu_{0.5}(PO_4)(WO_4)$ and $K_2Gd_{0.5}Eu_{0.5}(PO_4)(WO_4)$ monitoring at 616 nm.

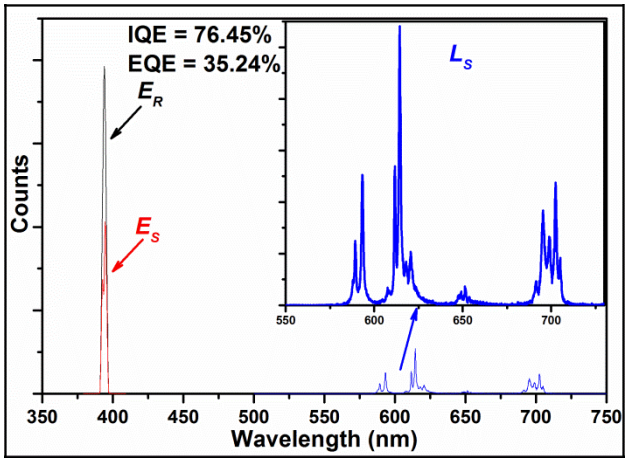

Figure 5S. Diffusion line of $BaSO_4$, $K_2Tb_{0.5}Eu_{0.5}(PO_4)(WO_4)$ and emission spectrum of $K_2Tb_{0.5}Eu_{0.5}(PO_4)(WO_4)$ collected by an integrated sphere.