Supporting information

Synthesis, Luminescence and Application of Novel Europium, Cerium and Terbium-Doped Apatite Phosphors

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Figure S1 XRD patterns of La$_{8.7-2y}$Ba$_2$(Si$_4$P$_2$O$_{22}$N$_2$)O$_2$:yCe$^{3+}$ (a), and La$_{7.94}$Ba$_2$(Si$_4$P$_2$O$_{22}$N$_2$)O$_2$:0.06Tb$^{3+}$ (b) (2θ = 29 - 33.08°).

Figure S2 SEM images of La$_{8.7-2y}$Ba$_2$(Si$_4$P$_2$O$_{22}$N$_2$)O$_2$:yCe$^{3+}$, La$_{7.94}$Ba$_2$(Si$_4$P$_2$O$_{22}$N$_2$)O$_2$:0.06Tb$^{3+}$ and La$_{7.995-z}$Ba$_2$(Si$_4$P$_2$O$_{22}$N$_2$)O$_2$:0.005Ce$^{3+}$,zTb$^{3+}$. 
Figure S3  The typical SEM and elemental mapping images of La$_{7.995}$Ba$_2$(Si$_4$P$_2$O$_{22}$N$_2$)O$_2$:0.005Ce$^{3+}$ (a), La$_{7.94}$Ba$_2$(Si$_4$P$_2$O$_{22}$N$_2$)O$_2$:0.06Tb$^{3+}$ (b), and La$_{7.935}$Ba$_2$(Si$_4$P$_2$O$_{22}$N$_2$)O$_2$:0.005Ce$^{3+}$,0.06Tb$^{3+}$ (c).
Figure S4 Decay curves of La$_{8}$Ba$_{2-x}$(Si$_4$P$_2$O$_{22}$N$_2$)O$_2$:$xEu^{2+}$ monitored at 492 nm and excited by 368 nm (a) and monitored at 560 nm and excited by 368 nm (b).

Figure S5 Temperature-dependent relative luminescence intensities of La$_{7.995}$Ba$_{2}$(Si$_4$P$_2$O$_{22}$N$_2$)O$_2$:0.005Ce$^{3+}$ and La$_{7.895}$Ba$_{2}$(Si$_4$P$_2$O$_{22}$N$_2$)O$_2$:0.005Ce$^{3+}$,0.10Tb$^{3+}$. 