Supporting Information

Site-Sensitive Energy Transfer Modes in $Ca_3Al_2O_6$: $Ce^{3+}/Tb^{3+}/Mn^{2+}$ Phosphors

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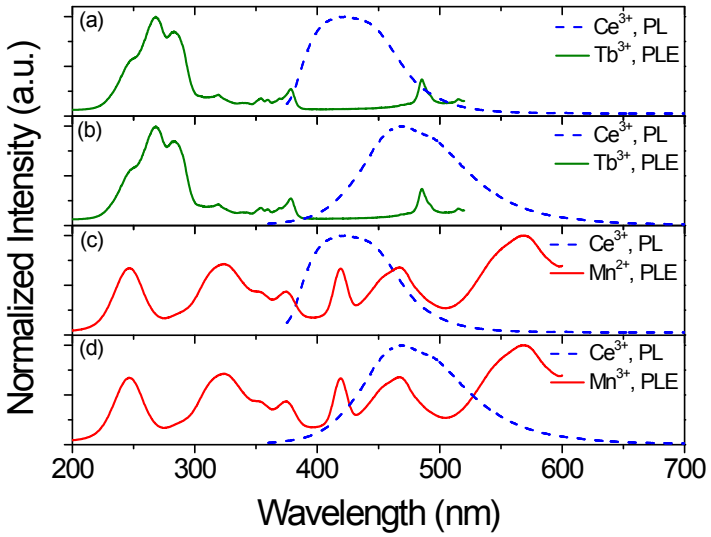

Fiugre S1. The comparison of PLE spectra of Tb^{3+}/Mn^{2+} and PL spectra of Ce^{3+} in $Ca_3Al_2O_6$, showing different spectral overlap manners.

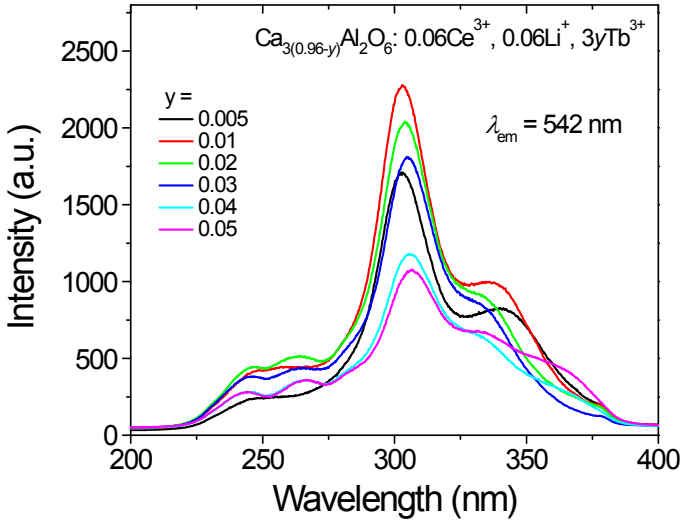

Figure S2. PLE spectra of $Ca_{3(0.96-y)}Al_2O_6$: $0.06Ce^{3+}$, $0.06Li^{+}$, $3yTb^{3+}$ monitored at 542 nm. Excitation bands contain several bands. The highest one is at ~305 nm with a shoulder at ~335 nm, which belongs to *f-d* transition of Ce^{3+}, suggesting energy transfer from Ce^{3+} to Tb^{3+}. An additional band at ~367 nm appears when *y* is higher than 0.04. This phenomenon indicates the existence of purplish-blue Ce^{3+} and the transfer of its energy to Tb^{3+} with a high content. Furthermore, the excitation bands at about 245, 263 and 283 nm are consistent with that of Tb^{3+} single-doped one.

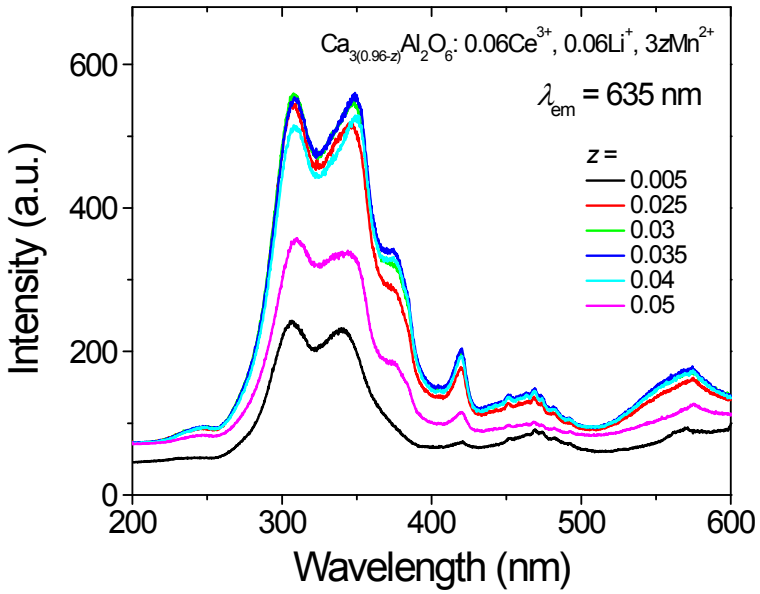

Figure S3. PLE spectra of $Ca_{3(0.96-z)}Al_2O_6$: $0.06Ce^{3+}$, $0.06Li^{+}$, $3zMn^{2+}$ monitored at 635 nm. The excitation bands mainly two bands at 305 and ~ 335 nm, which are similar as that monitored at 470 nm. These results suggest energy transfer from greenish-blue Ce^{3+} to Mn^{2+}. In addition, a shoulder band at ~370 nm and several bands in 400-600 range appear, which originate from *d*-*d* transitions of Mn^{2+} itself.