Figure 1. (b) Experimental (cross), calculated (solid line) and difference (bottom) results of XRD refinements of CaYAlO$_4$:2%Eu$^{3+}$, CaY$_{0.9}$Al$_{1.1}$O$_4$:2%Eu, CaY$_{0.9}$Al$_{1.1}$O$_4$:2%Eu
Figure 2. The structure diagram CaYAlO$_4$ and the (Ca/Y)O$_9$ polyhedron is closely surrounded by AlO$_6$ octahedrons to form a cage structure.

Figure 3. Powder X-ray diffraction (XRD) patterns of CaY$_{0.7}$Al$_{1.3}$O$_4$:2%Eu and the standard cards of Ca$_3$Y$_2$O$_6$ (JCPDS:28-0856) and CaAl$_2$O$_4$ (JCPDS:23-1036).
Figure 4. Emission ($\lambda_{\text{ex}} = 396$ nm) and Excitation ($\lambda_{\text{em}} =$592, 621, 702 nm) spectra of CaYAlO$_4$:2%Eu$^{3+}$ sample at room temperature.

Figure 5. (a) PLE and PL spectra of CaY$_{1-x}$Al$_{1+x}$O$_4$:2%Eu (x=0.1) and CaY$_{1-x}$Al$_{1+x}$O$_4$:2%Eu (x=0, 0.1, 0.2) samples prepared in 95%N$_2$+5%H$_2$ atmosphere.