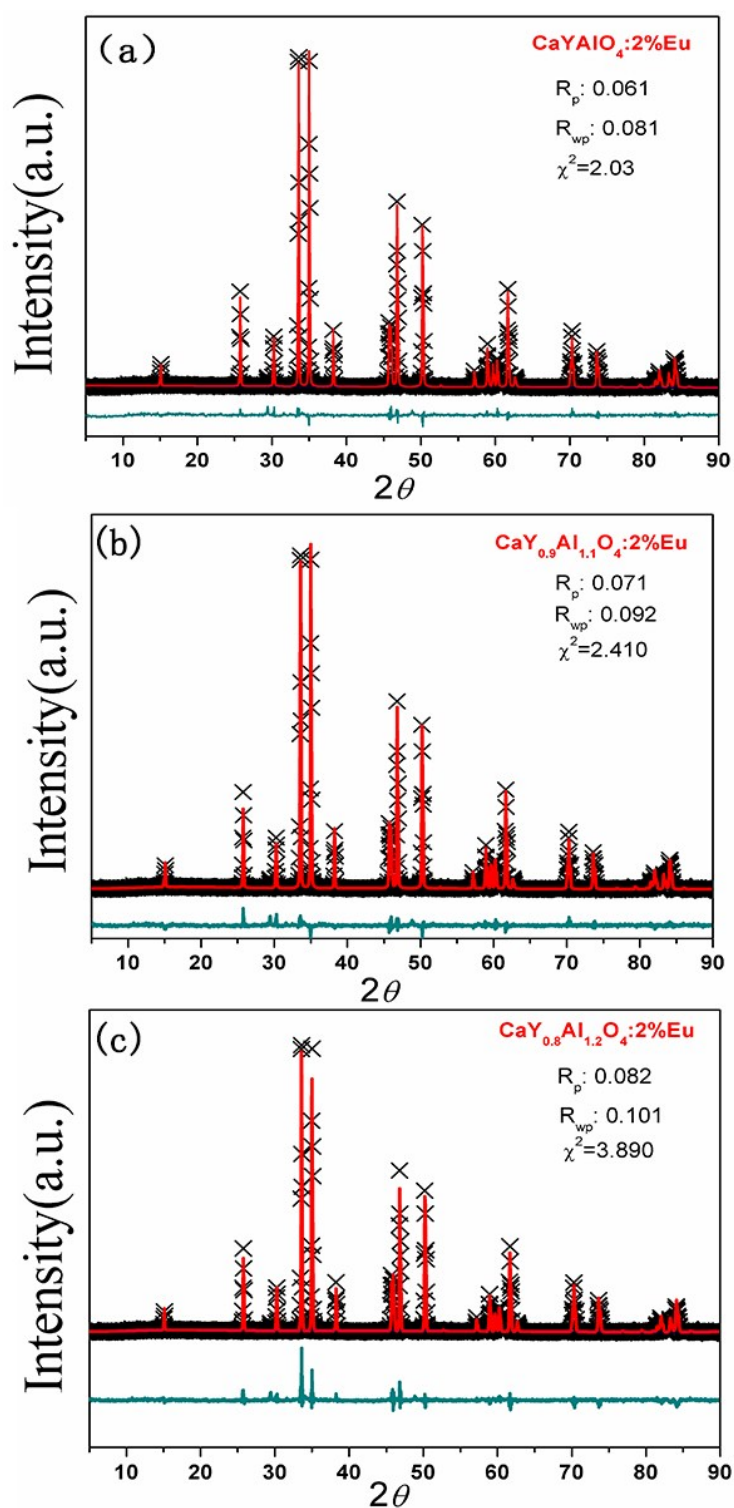
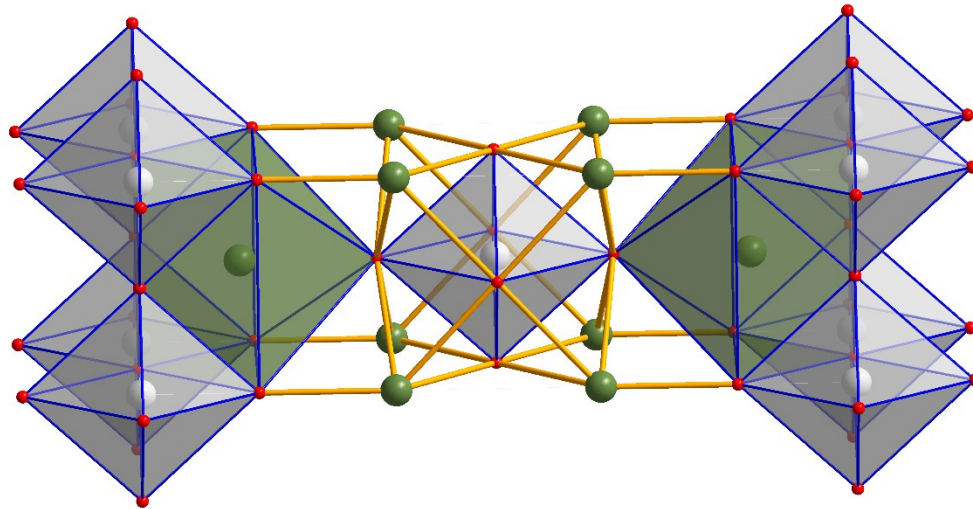


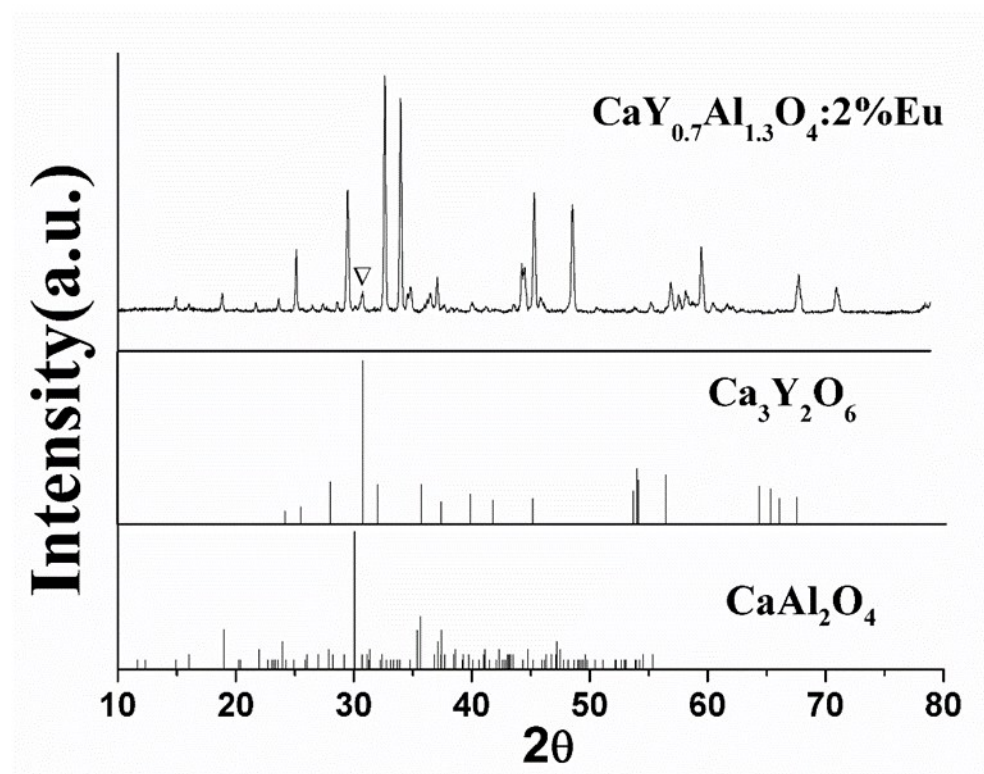
Supporting Material



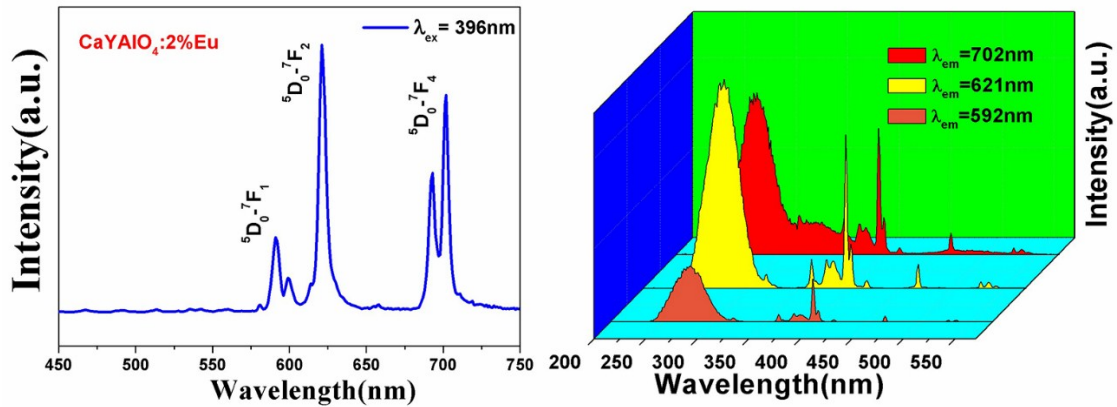
**Figure 1.** (b) Experimental (cross), calculated (solid line) and difference (bottom) results of XRD refinements of CaYAlO<sub>4</sub>:2%Eu<sup>3+</sup>, CaY<sub>0.9</sub>Al<sub>1.1</sub>O<sub>4</sub>:2%Eu, CaY<sub>0.8</sub>Al<sub>1.2</sub>O<sub>4</sub>:2%Eu



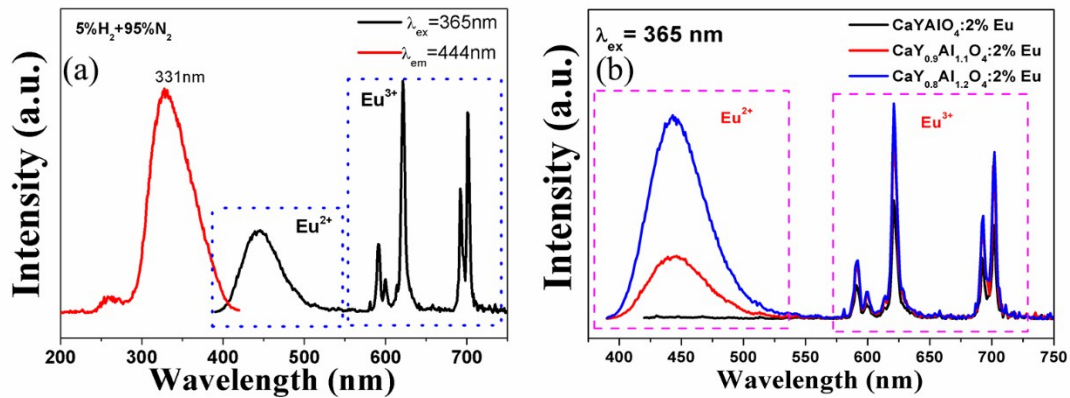
**Figure 2.** The structure diagram  $\text{CaYAlO}_4$  and the  $(\text{Ca}/\text{Y})\text{O}_9$  polyhedron is closely surrounded by  $\text{AlO}_6$  octahedrons to form a cage structure.



**Figure 3.** Powder X-ray diffraction (XRD) patterns of  $\text{CaY}_{0.7}\text{Al}_{1.3}\text{O}_4:2\%\text{Eu}$  and the standard cards of  $\text{Ca}_3\text{Y}_2\text{O}_6$  (JCPDS:28-0856) and  $\text{CaAl}_2\text{O}_4$  (JCPDS:23-1036).



**Figure 4.** Emission ( $\lambda_{\text{ex}} = 396 \text{ nm}$ ) and Excitation ( $\lambda_{\text{em}} = 592, 621, 702 \text{ nm}$ ) spectra of  $\text{CaYAlO}_4:2\%\text{Eu}^{3+}$  sample at room temperature.



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