

## Supporting Information

### Structural design and evolution of a novel Bi<sup>3+</sup> doped narrow-band emission blue phosphor with excellent photoluminescence performance for wide color gamut wLED

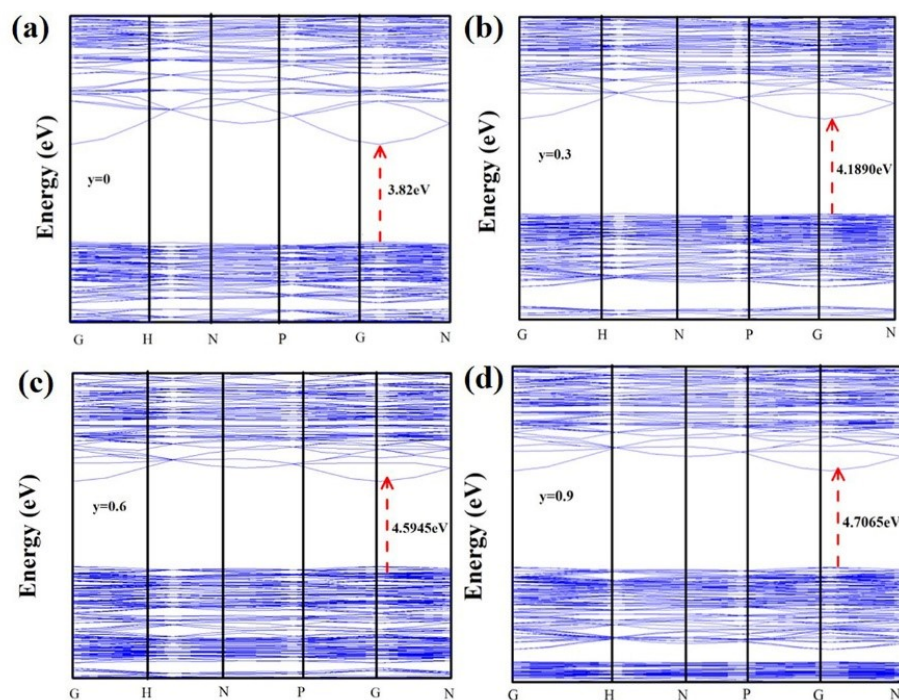
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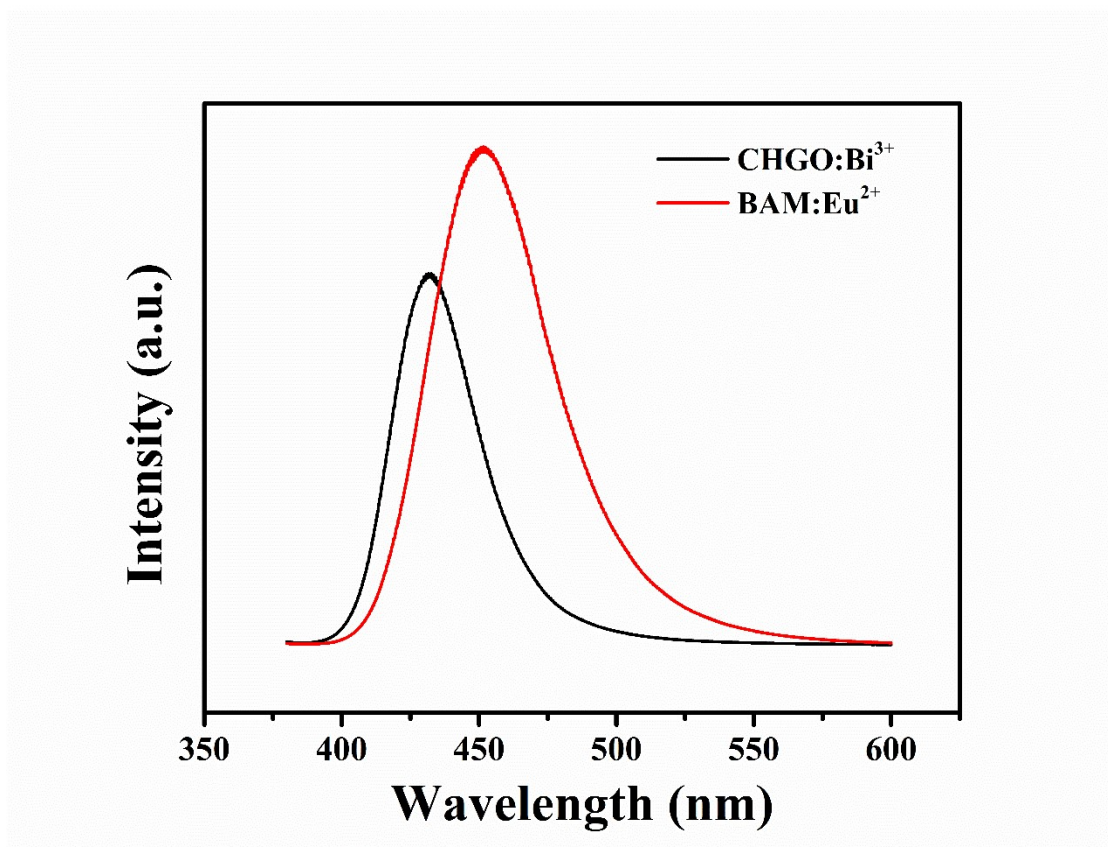
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**Fig. S1** Energy band structure of  $\text{Ca}_4\text{HfGe}_{3-y}\text{Si}_y\text{O}_{12}$  ( $y=0, 0.3, 0.6, 0.9$ ) based on the DFT calculation.



**Fig. S2** PL spectra of  $\text{Ca}_4\text{HfGe}_3\text{O}_{12}: 0.02\text{Bi}^{3+}$  and commercial BAM:  $\text{Eu}^{2+}$  under the excitation of 369 nm