Supporting Information

Structural design and evolution of a novel Bi$^{3+}$ doped narrow-band emission blue phosphor with excellent photoluminescence performance for wide color gamut wLED

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**Fig. S1** Energy band structure of Ca$_4$HfGe$_{2-2y}$Si$_y$O$_{12}$ (y=0, 0.3, 0.6, 0.9) based on the DFT calculation.

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