Enhanced luminescence performance of CaO:Ce³⁺, Li⁺, F⁻ phosphor and its phosphor-in-glass based high-power warm LED properties

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Figure S1. PLE and PL spectra of COCLF-6 and YAG:Ce³⁺ phosphors.



Figure S2. $\log(I/y)$ as a function of doping concentration y in CaO:yCe³⁺, yLi⁺.



Figure S3. XPS spectra and fitting peaks of Ce3d in (A) COCLF-6 and (B) COCL-7.



Figure S4. SEM image of COCLF-6 phosphor powders.



Figure S5. (A) PL spectra of COCLF-6-based PiG (mass ratio = 7 : 50) with different temperature ranging from 30 to 300 °C. The inset shows corresponding temperature-dependent PL intensity of COCLF-6. (B) Relative intensity as a function of time in PiG in air.



Figure S6. Normalized EL spectra of PiG (mass ratio = 7 : 50)-based wLEDs under different operating currents (50-300 mA).