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Supporting Information

Shielding Effect and Compensation Defect Study on $Na_3Sc_2(PO_4)_y:Eu^{2+,3+}$ (y = 2.6-3.0) Phosphor by Anion-Group-Induced Phase Transition

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Table S1. The different coordination of $NS(PO)_y$:0.13Eu^{2+} (y = 2.6–3.0) in CIE chromaticity diagram.

Symbol	y value	x axis	y axis
I	2.6	0.6347	0.3648
II	2.7	0.6390	0.3606
III	2.8	0.1850	0.1257
IV	2.9	0.1448	0.0649
V	3.0	0.1490	0.0470

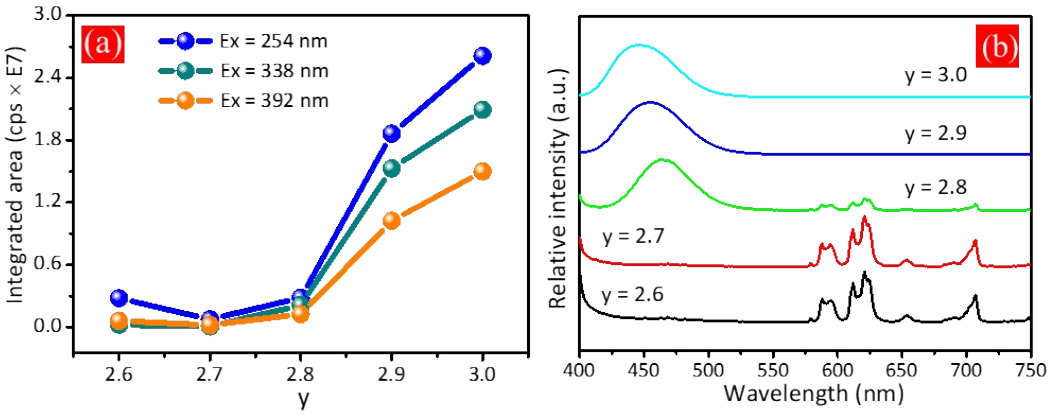

Figure S1. (a) The integrated area of emission spectra under different excitation wavelengths. (b) The emission spectra under excitation wavelength at 392 nm.

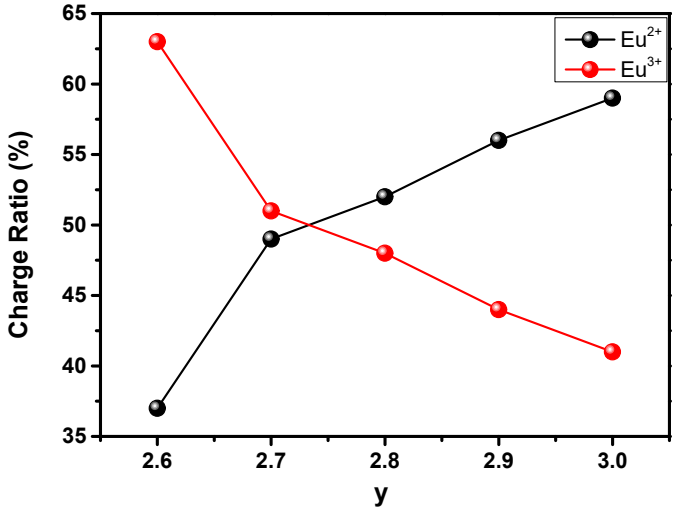

Figure S2. The Eu^{2+} and Eu^{3+} ratios were calculated by XRF mapping of the $NS(PO_4)_y$:0.13Eu^{2+} phosphor with y values from 2.6 to 3.0.

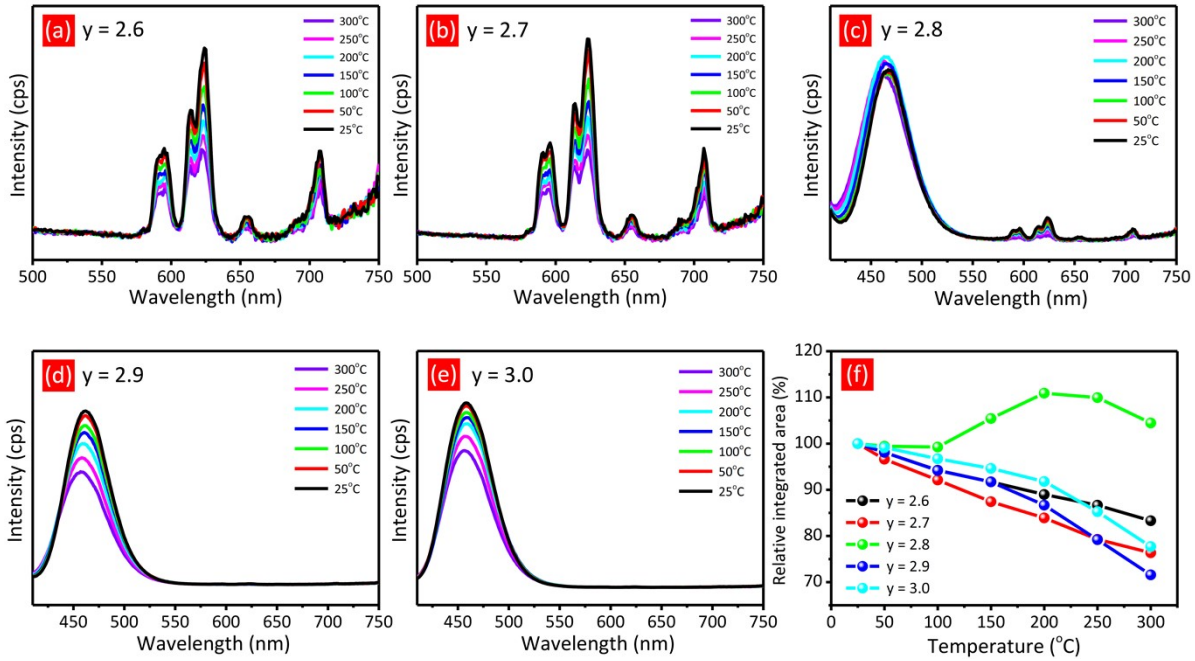

Figure S3. (a-e) The temperature-dependent PL spectra of $NS(PO_4)_y$:0.13Eu^{2+}, y = 2.6-3.0 which measured from 25 to 300°C. (f) The comparative relative integrated area (%) of the temperature-dependent PL spectra of $NS(PO_4)_y$:0.13Eu^{2+} with different y values.

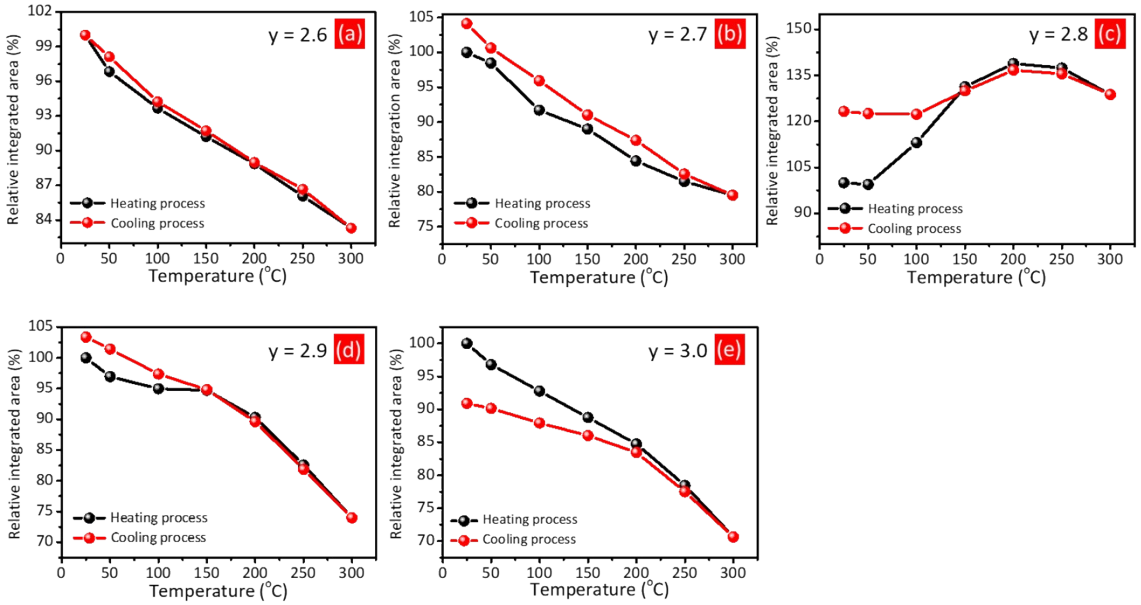

Figure S4. The correlation between the heating and cooling process of the $NS(PO_4)_y$:0.13Eu^{2+} phosphor with y values from (a) 2.6 to (e) 3.0 were interpreted by the relative-integrated area series.

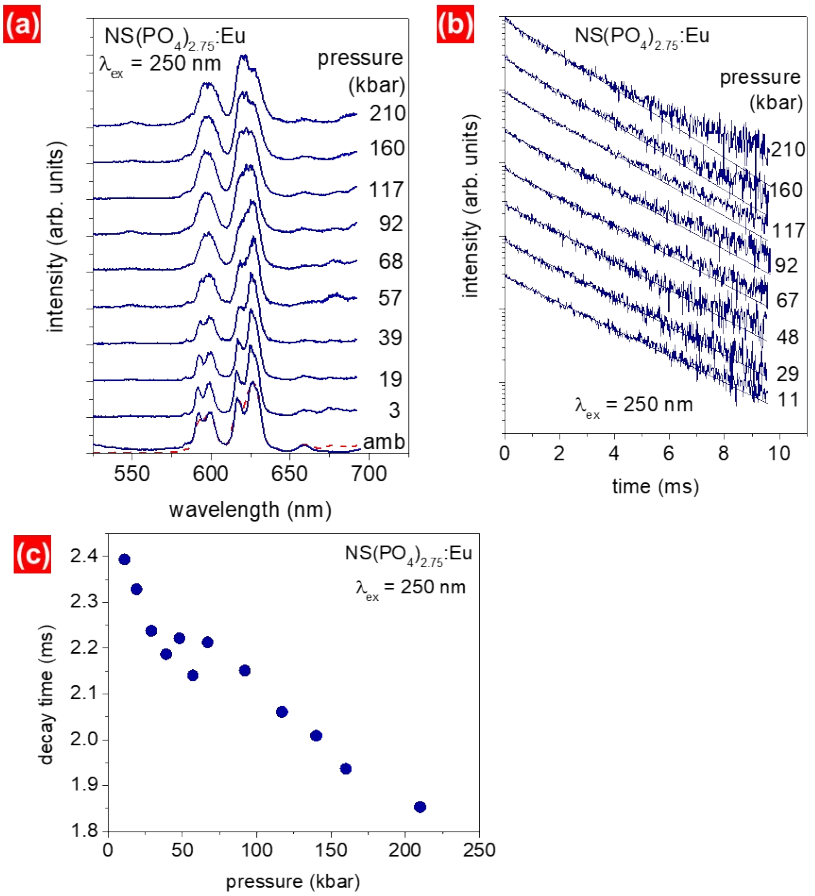

Figure S5. The pressure-dependent emission spectra (a), decay profiles (b), and decay times (c) of Eu^{3+} ion upon excitation at 250 nm of $NS(PO_4)_{2.75}$:Eu. Emission spectra and decay profiles were integrated in 10 ms range.