Supplementary information

Effects of varying Al_x moles on the structure and luminescence properties of $ZnAl_xO_{1.5x+1}$:0.1% Tb^{3+} nanophosphor prepared using citrate sol-gel method

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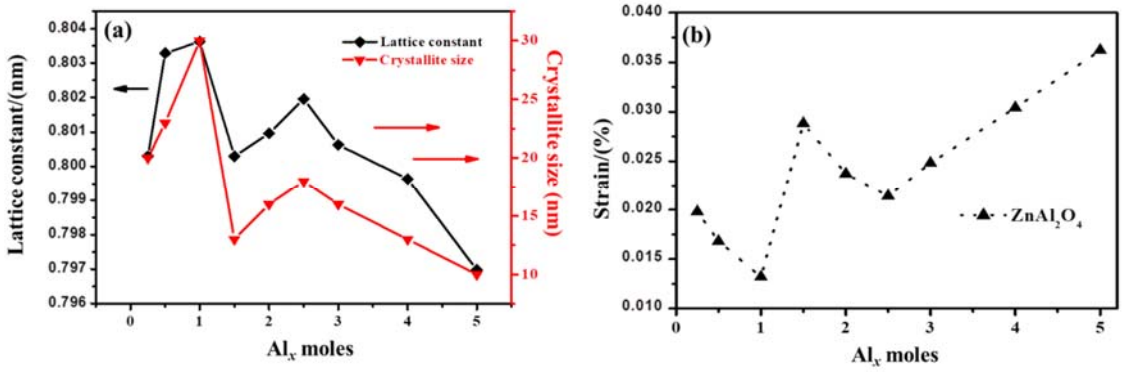

Fig. S1 The (a) lattice constant and crystallite size (nm); and (b) strain of $ZnAl_2O_4$ phase as a function of Al_x moles.

The Scherrer's formula equation S1

$$D = \frac{0.9\lambda}{\beta \cos\theta} \qquad \ldots \text{S1}$$

where λ is the radiation wavelength (0.15406 nm), β is the full width at half maximum (FWHM) (in radians) and θ is the angle of diffraction (degrees).

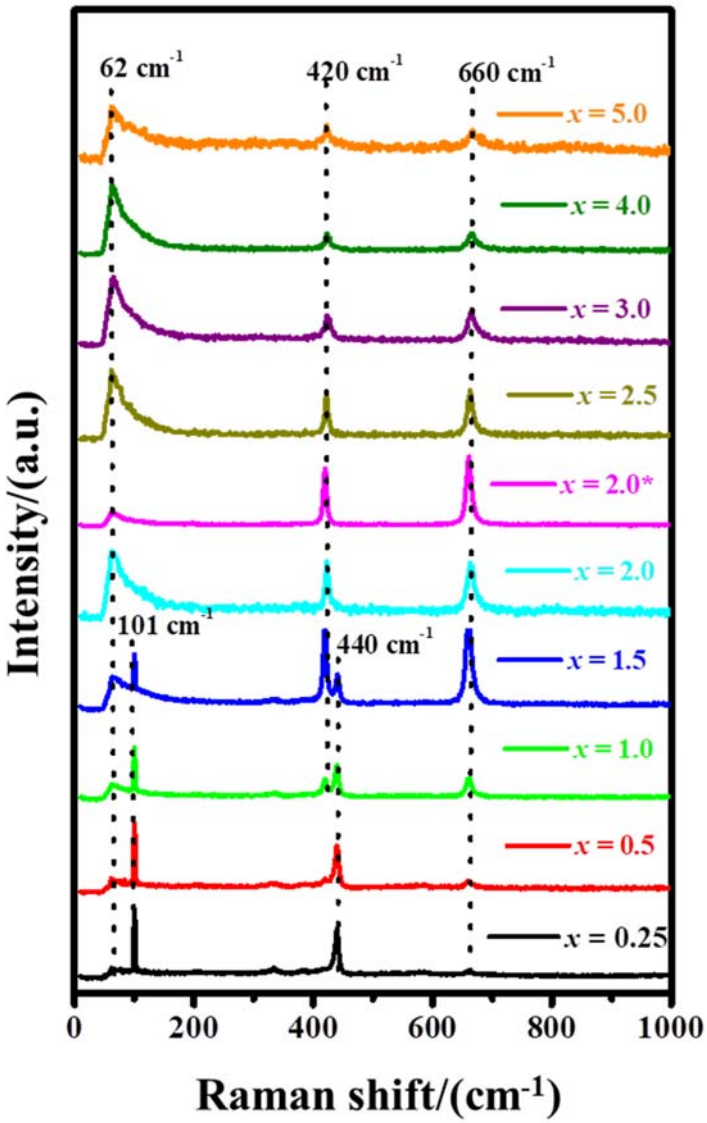

Fig. S2 Spectra for the x = 2.0* (un-doped $ZnAl_2O_4$) and $ZnAl_xO_{1.5x+1}$:0.1% Tb^{3+} ($0.25 \leq x \leq 5.0$).

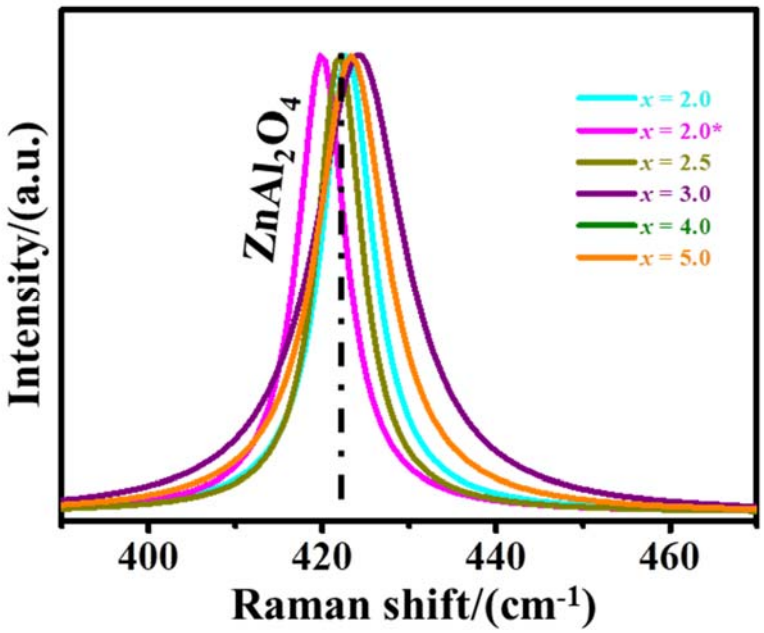

Fig. S3 The zoomed version of the E_g of $ZnAl_2O_4$

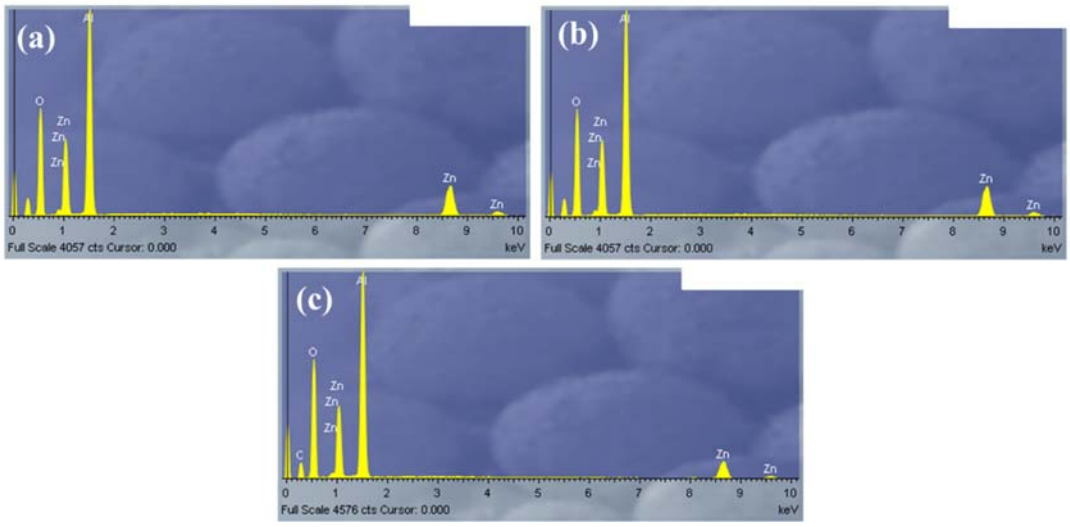

Fig. S4 EDS spectrum of the $ZnAl_xO_{1.5x+1}$:0.1% Tb^{3+} where (a) x = 2.0* (un-doped $ZnAl_2O_4$), (b) 2.0, and (c) 4.0 nano-phosphors.