Supporting Information

Thermally robust and valence variation induced white light emission of a novel stannate phosphor $Sr_3Al_{10}SnO_{20}$: Dy^{3+}: Crystal structure, luminescence property and mechanism investigation

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Table S1 The effective ionic radius of Dy, Sr and Sn with different valence state and coordinated numbers (CN).

ION	OX.State	Elec.Config	CN	Ionic Radius
Dy+3	3	4f9	6	0.912
Dy+3	3	4f9	7	0.97
Dy+3	3	4f9	8	1.027
Dy+3	3	4f9	9	1.083
Sn+4	4	4d10	4	0.55
Sn+4	4	4d10	5	0.62
Sn+4	4	4d10	6	0.69
Sn+4	4	4d10	7	0.75

Sn+4	4	4d10	8	0.81
Sr+2	2	4p6	6	1.18
Sr+2	2	4p6	7	1.21
Sr+2	2	4p6	8	1.26
Sr+2	2	4p6	9	1.31
Sr+2	2	4p6	10	1.36
Sr+2	2	4p6	12	1.44

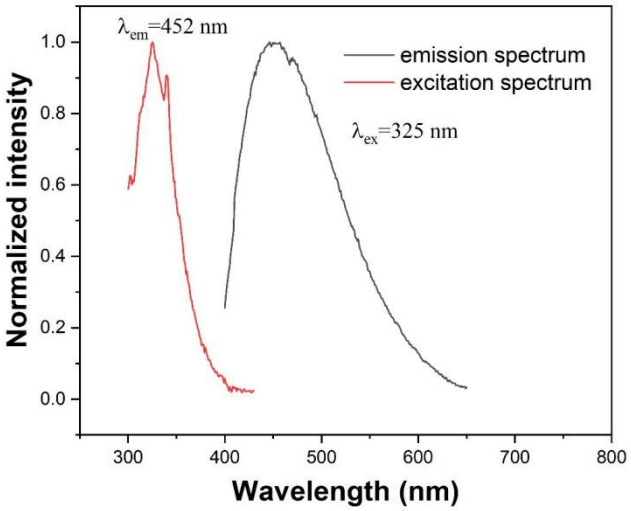

Figure S1 The excitation and emission spectra of $Sr_3Al_{10}SnO_{20}$ host.

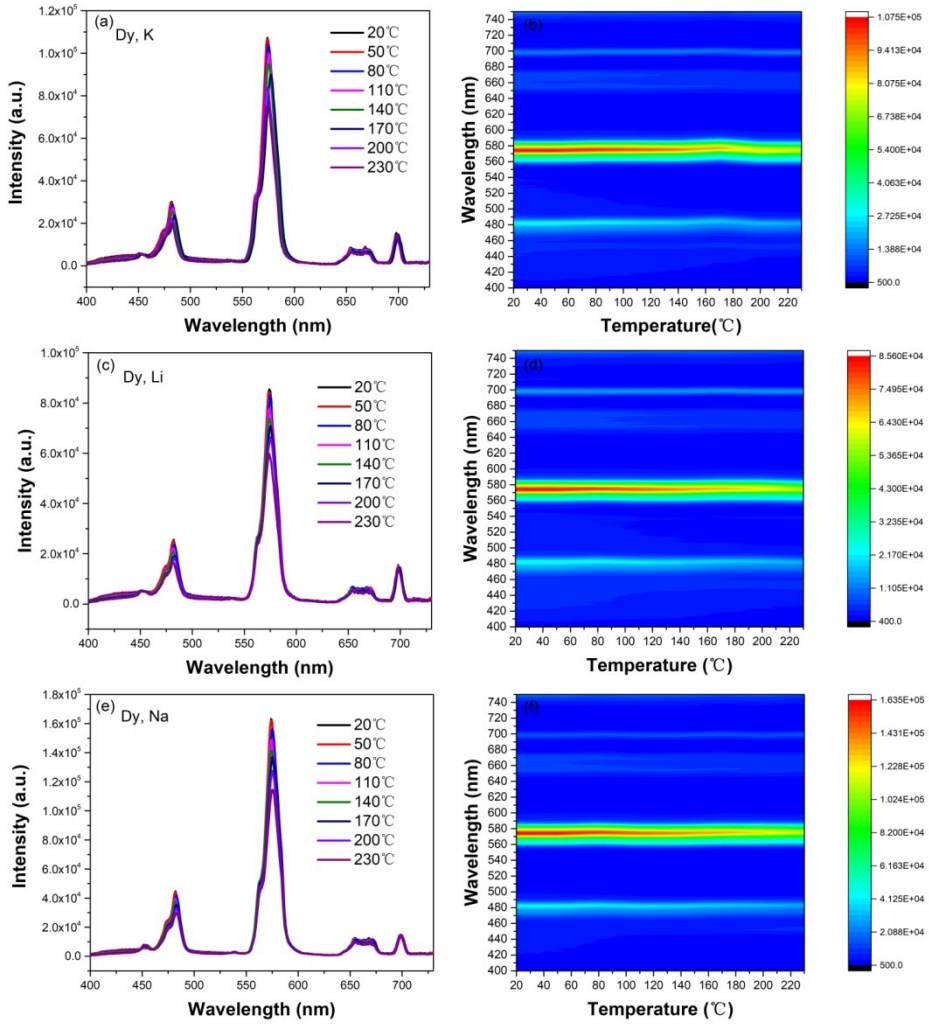

Figure S2 (a) The temperature dependent emission spectra of $Sr_3Al_{10}SnO_{20}$: $0.02Dy^{3+}$, $0.02K^+$ excited at 350 nm; (b) The thermal quenching mapping diagram of $Sr_3Al_{10}SnO_{20}$: $0.02Dy^{3+}$, $0.02K^+$; (c) The temperature dependent emission spectra of $Sr_3Al_{10}SnO_{20}$: $0.02Dy^{3+}$, $0.02Li^+$ excited at 350 nm; (d) The thermal quenching mapping diagram of $Sr_3Al_{10}SnO_{20}$: $0.02Dy^{3+}$, $0.02Li^+$; (e) The temperature dependent emission spectra of $Sr_3Al_{10}SnO_{20}$: $0.02Dy^{3+}$, $0.02Na^+$ excited at 350 nm; (f) The thermal quenching mapping diagram of $Sr_3Al_{10}SnO_{20}$: $0.02Dy^{3+}$, $0.02Na^+$;

The calculation process of the dispersion degree for the thermal quenching property is based on the following equation,

$$\Delta x = \sqrt{\sum_{i=1}^{i=n}\left(x_i - \bar{x}\right)}, \quad \Delta y = \sqrt{\sum_{i=1}^{i=n}\left(y_i - \bar{y}\right)},$$

Where x_i and y_i are the color coordinates at a given temperature t, n is the number of temperature points, and $\bar{x}$, $\bar{y}$ stand for the average values of the color coordinates x and y for all the temperature points.