Synthesis, dual mode luminescence and down-conversion based thermometric properties of the novel $Y_{2\text{-}x\text{-}y}LaCaGa_3ZrO_{12}$:$x$$Er^{3+}$, $y$$Yb^{3+}$ phosphors

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Table S1. Crystallite size values of the $Y_{2-x}LaCaGa_3ZrO_{12}$:$x$$Er^{3+}$ and $Y_{1.92-y}LaCaGa_3ZrO_{12}$:0.08$Er^{3+}$, $y$$Yb^{3+}$ phosphors.

$Y_{2-x}LaCaGa_3ZrO_{12}$:$x$$Er^{3+}$		$Y_{1.92-y}LaCaGa_3ZrO_{12}$:0.08$Er^{3+}$, $y$$Yb^{3+}$	
Sample	Crystallite size (nm)	Sample	Crystallite size (nm)
$x = 0$	50.6	$y = 0$	45.6
$x = 0.02$	43.3	$y = 0.05$	55.7
$x = 0.04$	50.6	$y = 0.1$	55.5
$x = 0.06$	53.2	$y = 0.2$	43.3
$x = 0.08$	45.6	$y = 0.3$	41.0
$x = 0.1$	43.4	$y = 0.5$	55.5

Table S2. Comparison between the thermometric parameters (S_A and S_R) of the $Y_{1.92}LaCaGa_3ZrO_{12}:0.08Er^{3+}$ and $Y_{1.72}LaCaGa_3ZrO_{12}:0.08Er^{3+}$, $0.2Yb^{3+}$ based thermometer with thermometers reported in the literature.

	Host	Excitation (nm)	Temperature range (K)	S_A ($\times10^{-4}$ K^{-1})	S_R (%K^{-1})	Reference
1	$Y_{1.92}LaCaGa_3ZrO_{12}:0.08Er^{3+}$	980	200-300 K 300-525 K	16 (300 K) 18 (425 K)	2.94 (200 K) 0.97 (300 K)	This work
2	$Y_{1.72}LaCaGa_3ZrO_{12}:0.08Er^{3+}$, $0.2Yb^{3+}$	980	200-300 K 300-525 K	13 (300 K) 15.8 (500 K)	3.02 (200 K) 0.97 (300 K)	This work
3	$Ca_3Y_2Ge_3O_{12}:Er^{3+}$, Yb^{3+}	980	293-463 K	20 (463 K)	1.29 (463 K)	1
4	$LaNbO_4:Er^{3+}$, Yb^{3+}	980	303-453 K	-	1.2 (303 K)	2
5	$Ba_2SrLu_4O_9:Yb^{3+}/Er^{3+}$	980	303–573	46 (573 K)	0.99 (313 K)	3
6	$Al_2Mo_3O_{12}:Er^{3+}$, Yb^{3+}	980	303-603	111	1.09	4
7	$Sr_2YTaO_6:Er^{3+}$, Yb^{3+}	980	293-473 K	0.078 (473 K)	1.32 (293K)	5
8	$PbZrTiO_3$: Er^{3+}, Yb^{3+}	980	270-575	15 (323 K)	-	6
9	$Ba_5Y_8Zn_4O_{21}:Er^{3+}$, Yb^{3+}	980	293-563	39 (563 K)	1.36 (293 K)	7
10	$Y_4GeO_8:Er^{3+}$, Yb^{3+}	980	303-573 K	45.5 (303 K)	1.152	8
11	$Ca_2MgWO_6:Er^{3+}$, Yb^{3+}	980	303-573 K	82 (303 K)	0.92	9
12	$NaY(WO_4)_2:Er^{3+}$, Yb^{3+}	980	293-503	90 (503)	1.2 (293 K)	10
13	β-$NaY_{0.8}Gd_{0.2}F_4$: Eu^{3+}/Dy^{3+}	250	303-563	23	-	11
14	$SrLaLiTeO_6:Er^{3+}$	379	298-573	70.4	1.20	12
15	$Bi_4Ti_3O_{12}:Pr^{3+}/Er^{3+}$	481	298-568	20 (568 K)	1.03	13
16	$Ca_2YZr_2Al_3O_{12}:Bi^{3+}$, Eu^{3+}	278	297-573 K	82.6	0.664	14
17	$Ba_2LaNbO_6:Mn^{4+}$, Eu^{3+}	396	298-498	-	2.08	15
18	$Ca_2LaNbO_6:Mn^{4+}$, Eu^{3+}	396	298-498	-	1.51	15
19	$(Ca,Sr)_{10}Li(PO_4)_7:Ce^{3+}$, Mn^{2+}	310	293-473	-	0.40 (473 K)	16
20	$KYb_2F7:Er^{3+}$	980	300-600	140 (300 K)	0.45 (590 K)	17
21	$GaN:Er^{3+}$, Yb^{3+}	980	200-300	15 (200 K)	-	18
22	$LaF_3:Er^{3+}$, Yb^{3+}	980	300-325	15.7 (386 K)	0.88 (300 K)	19

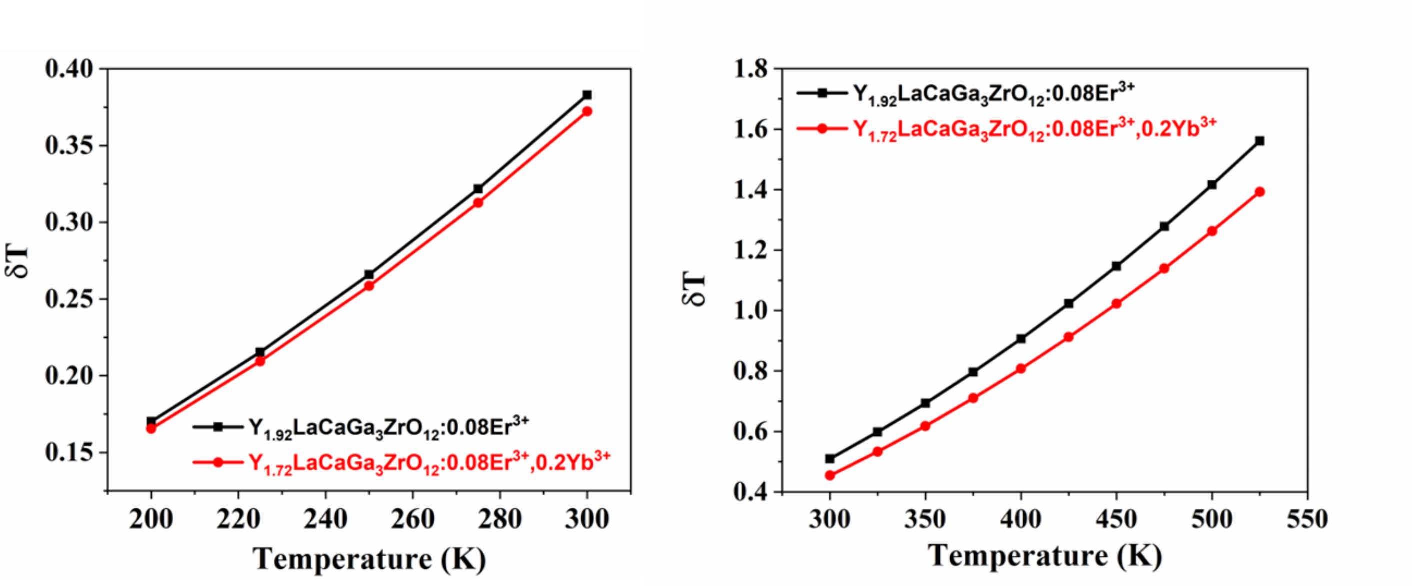

Fig. S1 Temperature uncertainty (δT) of the $Y_{1.92}LaCaGa_3ZrO_{12}:0.08Er^{3+}$ and $Y_{1.72}LaCaGa_3ZrO_{12}:0.08Er^{3+}$, $0.2Yb^{3+}$ measured for 200-300 K (left) and 300-500 K (right) temperature range.

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