Electronic Supplementary Material (ESI) for CrystEngComm.

Supplementary materials

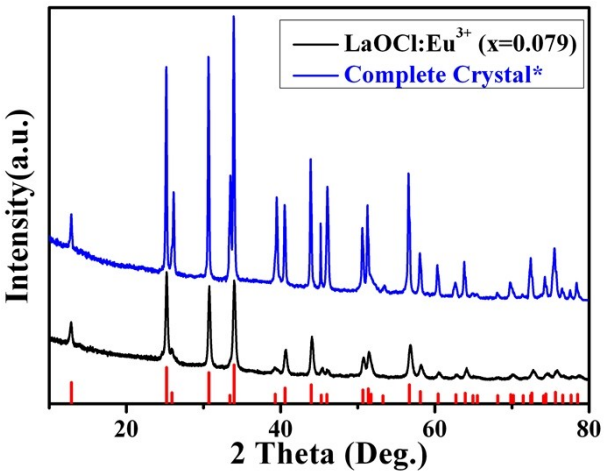


Fig. S1 XRD patterns of LaOCl:Eu^{3+} sample (x = 0.079) and complete crystal sample. Vertical bars at the bottom denote the standard data for a tetragonal PbFCl structure of bulk LaOCl (JCPDS, No. 01-088-0064)

* Complete crystal LaOCl sample, which is obtained by calcining pure LaOCl sample (x=0) at 1000 °C for 48 h in a furnace, is taken as the standard sample for the crystallinity calculation.

The crystallinity of LaOCl:Eu^{3+} samples can be described as follows:

Crystallintiy = intensity of all diffraction peaks of the sample / intensity of all diffraction peaks of complete crystal sample

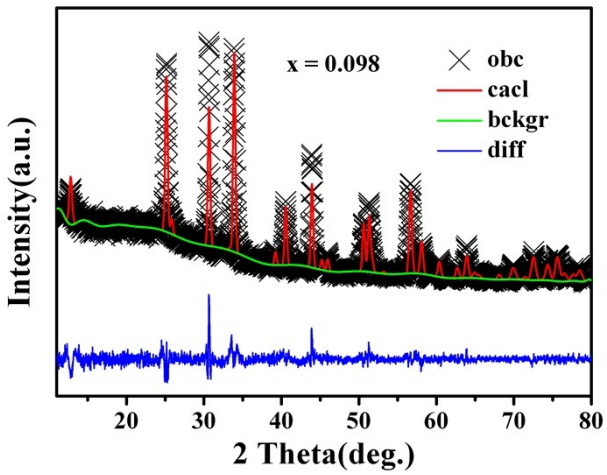
Table S1 The crystallinity of LaOCl:Eu^{3+} nanodisks

Sample	Crystallinity	Sample	Crystallinity
0	41.87%	0.12	43.46%
0.02	42.98%	0.15	40.97%
0.04	50.46%	0.20	39.94%
0.06	48.09%	0.25	37.93%
0.08	45.38%	0.30	37.47%
0.10	43.61%	Complete Crystal *	100%

Table S2 The relationship between initial molar ratio and measurement molar ratio of LaOCl:Eu^{3+} nanodisks

Initial molar ratio	Measurement molar ratio (ICP)	Initial molar ratio	Measurement molar ratio (ICP)
0.02	0.015	0.12	0.116
0.04	0.037	0.15	0.148
0.06	0.056	0.20	0.197
0.08	0.079	0.25	0.248
0.10	0.098	0.30	0.294

As seen in Fig. S2, it is shown that the refinement data for the sample (x = 0.098, 0.148, 0.197 and 0.294), the "×" marks (in black) represent the experimental diffraction data, the solid curve (in red) shown the calculated diffraction data, and the straight bars show the standard diffraction data for bulk LaOCl, respectively. The blue solid line located at the bottom of the diffraction data represents the deviation between the calculated and experimental values.



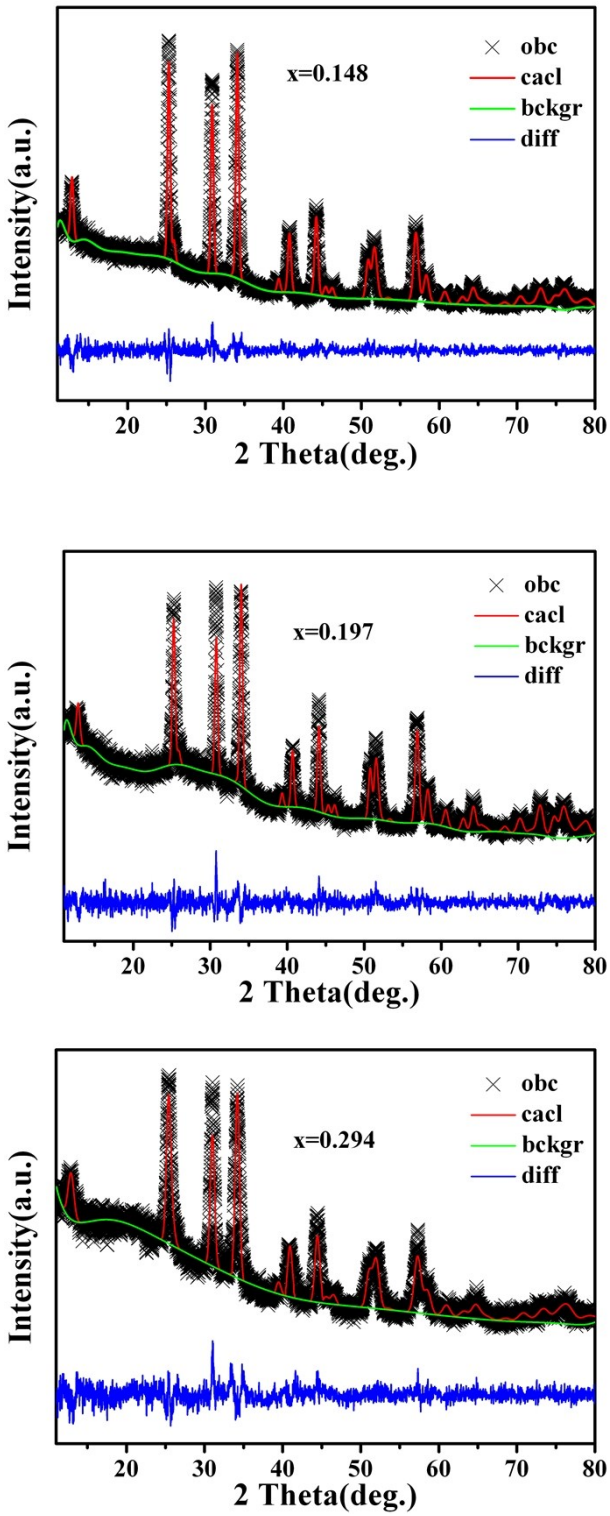


Fig. S2 Rietveld refined X-ray diffraction patterns of the Eu^{3+} doped LaOCl nanodisks.

Table S3 Rietveld refinement parameters for Eu^{3+} doped LaOCl nanodisks using GSAS program.

Sample	R_{wp}	R_p	χ^2	Sample	R_{wp}	R_p	χ^2
0	0.0987	0.0729	1.727	0.116	0.0614	0.0800	1.147
0.015	0.1095	0.0827	2.056	0.148	0.0609	0.0727	1.107
0.037	0.1055	0.0808	1.971	0.197	0.0630	0.0877	1.186
0.056	0.0703	0.0984	1.470	0.248	0.0645	0.0983	1.445
0.079	0.0653	0.0944	1.213	0.294	0.0591	0.0864	1.096
0.098	0.0641	0.0937	1.179				

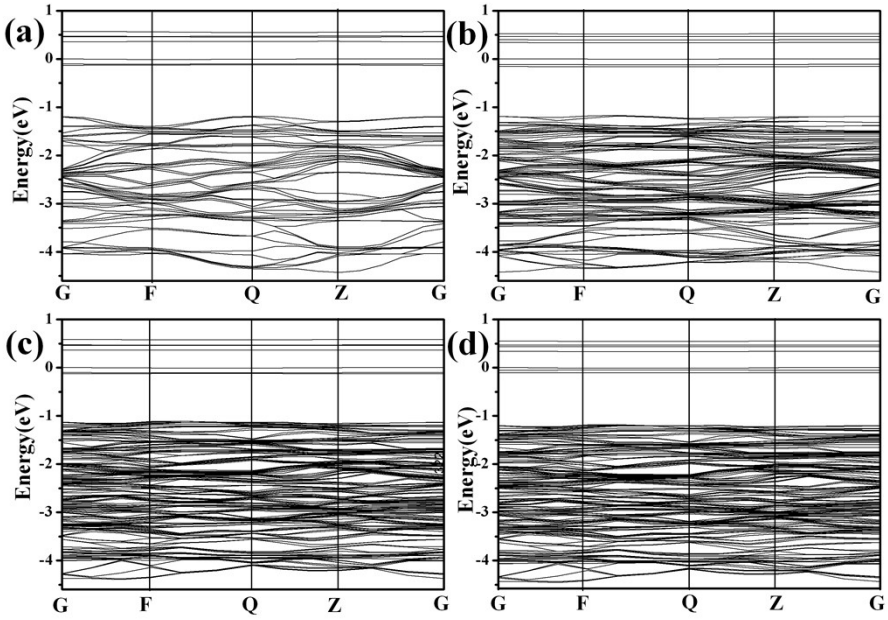


Fig. S3 Band structures of LaOCl:Eu^{3+} nanodisks. (a) x = 0.0417, (b) x = 0.0625, (c) x = 0.125, (d) x = 0.25

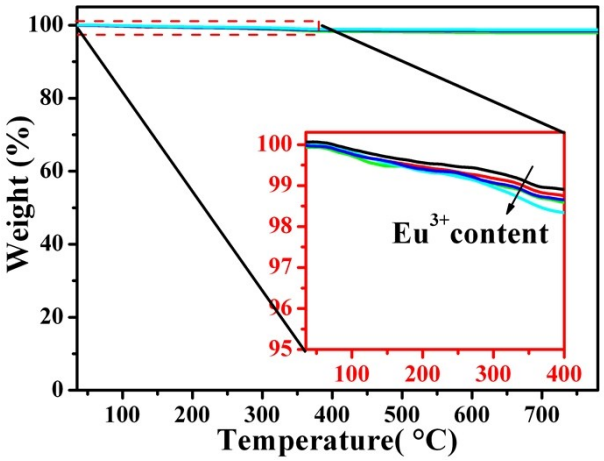


Fig. S4 TG curves of LaOCl:Eu^{3+} nanocrystalls.

As seen in Fig. S4, the mass loss occurs in a wide temperature ranged from room temperature up to 600 ℃. The relative mass loss was slowly decayed from temperature lower than 100 ℃ to 400 ℃. The distinct mass loss at temperatures lower than 100 ℃ indicated the presence of free water or physical absorbed water, while the continuous decay of relative mass versus temperature suggested that, for our LaOCl:Eu^{3+} crystals, the surface water molecules existed most likely in a wide set of energetically nonequivalent surface hydration groups. However, for our samples, the water weight loss was very small, which close to 1.3%.

Table S4 Parameters obtained from double-exponential fitting to the decay data of Eu^{3+} doped LaOCl nanodisks.

Sample	I_1	τ_1 (ms)	I_1(%)	I_2	τ_2(ms)	I_2(%)	τ(ms)
0.015	19514.59	0.919	0.248	59326.64	0.919	0.752	0.919
0.037	6621.92	0.299	0.080	75948.17	0.902	0.920	0.845
0.056	8142.58	0.264	0.106	68571.54	0.916	0.894	0.848
0.079	10986.08	0.397	0.129	74042.96	0.911	0.871	0.830
0.098	46980.00	0.618	0.579	34184.39	1.121	0.421	0.854
0.116	13171.86	0.284	0.206	50818.96	0.855	0.794	0.739
0.148	8860.05	0.176	0.160	46414.81	0.825	0.840	0.693
0.197	14148.95	0.278	0.239	44930.49	0.823	0.761	0.723
0.248	11872.03	0.191	0.247	36158.33	0.779	0.753	0.636
0.294	11455.75	0.151	0.327	23595.09	0.654	0.673	0.494

Table S5 CIE values and R/O values of $LaOCl:Eu^{3+}$ nanodisks.

Sample	CIE		R/O	Sample	CIE		R/O
	x	y			x	y	
0.015	0.583	0.346	10.66	0.116	0.596	0.338	12.67
0.037	0.618	0.345	9.83	0.148	0.607	0.341	11.48
0.056	0.575	0.338	10.17	0.197	0.565	0.343	6.83
0.079	0.618	0.341	12.25	0.248	0.556	0.335	6.10
0.098	0.616	0.342	11.97	0.294	0.550	0.345	5.13