Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Luminescence properties and its red shift of blue-emitting phosphor $Na_3YSi_3O_9:Ce^{3+}$ for UV LED

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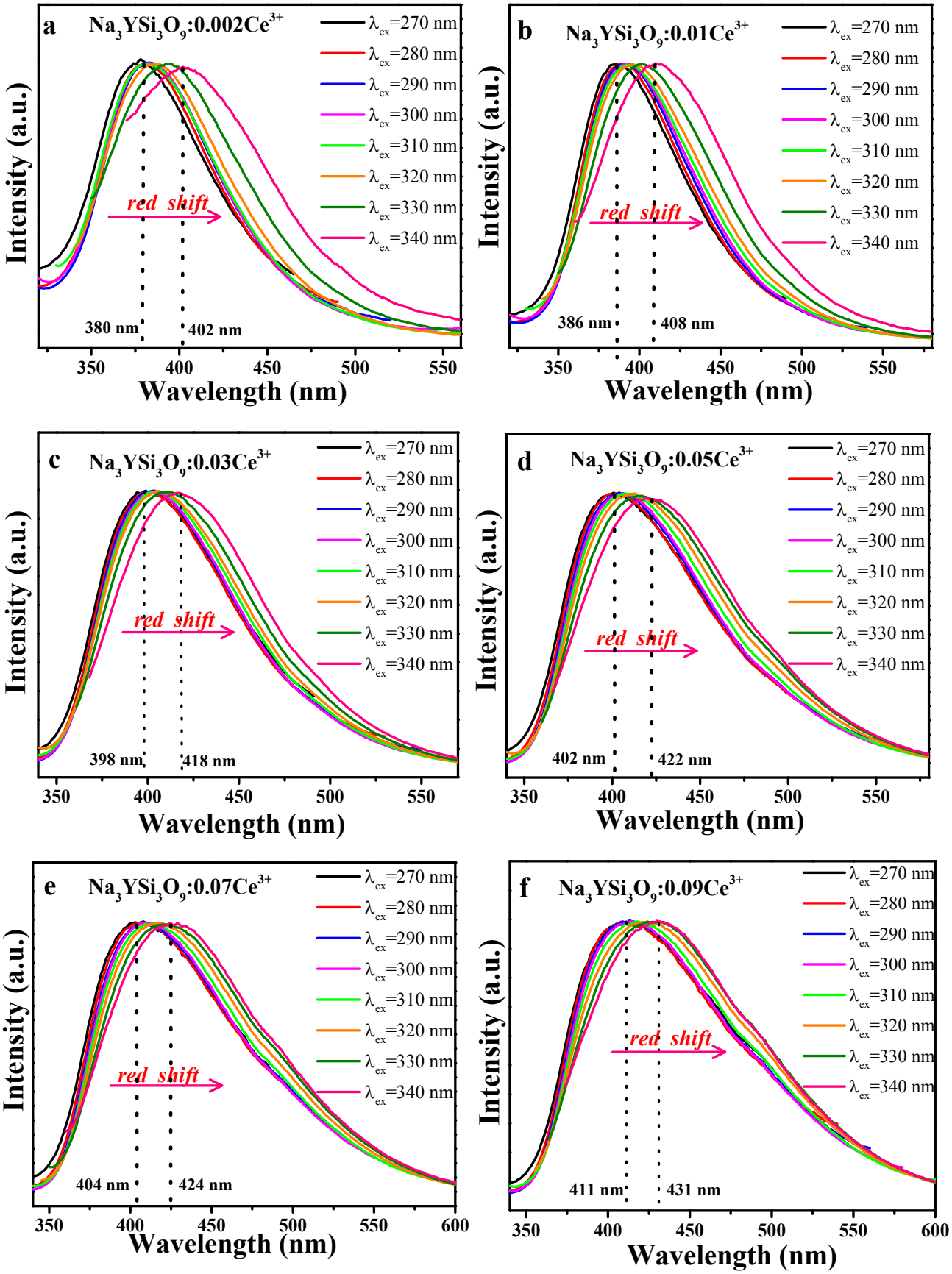
Table S1: Atomic coordinates and isotropic displacement parameters of $Na_3YSi_3O_9$: $0.03Ce^{3+}$ derived from the Rietveld refinement of X-ray diffraction date

Atoms	x (Å)	y(Å)	z(Å)	Frac	U_{iso}*100
Y1	0.3783(7)	0.3771(7)	0.3834(7)	1.000	1.267
Y2	0.1227(1)	0.1471(7)	0.1098(1)	1.000	1.343
Y3	0.3665(1)	0.1096(9)	0.8792(0)	1.000	1.267
Y4	0.1108(6)	0.3718(7)	0.6242(1)	1.000	1.089
Si1	0.4922(1)	0.4922(1)	0.7713(8)	1.000	0.887
Si2	0.4718(2)	0.2268(9)	-0.0045(3)	1.000	1.013
Si3	0.2627(5)	0.3994(9)	-0.0182(5)	1.000	1.013
Si4	0.0409(4)	0.0494(0)	0.7474(7)	1.000	1.140
Si5	0.4882(3)	0.2255(6)	0.7156(6)	1.000	1.013
Si6	0.2144(7)	0.5198(5)	0.2790(8)	1.000	1.140
Si7	0.2753(2)	0.0556(6)	0.2128(3)	1.000	1.013
Si8	0.2187(2)	0.2839(5)	0.9846(4)	1.000	1.013
Si9	0.5146(4)	0.2738(3)	0.5210(4)	1.000	1.520
Si10	0.2250(8)	0.0308(7)	0.5148(7)	1.000	1.393
Si11	0.0190(1)	0.2590(2)	0.7650(0)	1.000	1.393
Si12	0.2497(6)	0.2260(5)	0.5148(8)	1.000	1.267
Na1	0.1231(0)	0.3698(2)	0.4130(3)	1.000	1.773
Na2	0.0953(1)	0.1402(4)	0.5915(1)	1.000	2.660
Na3	0.4102(7)	0.0968(4)	0.6608(3)	1.000	2.406
Na4	0.4836(1)	0.4755(7)	1.0621(3)	1.000	2.026
Na5	0.1675(5)	0.0964(7)	0.9154(4)	1.000	2.153
Na6	0.1339(8)	0.3909(7)	0.8834(3)	1.000	1.267
Na7	0.1446(0)	0.1360(8)	0.3318(2)	0.970	2.533
Na8	-0.0520(6)	0.0325(7)	0.4441(9)	1.000	3.546
Na9	0.1088(3)	0.4107(3)	0.1493(3)	1.000	3.166
Na10	0.2762(8)	0.2685(0)	0.1943(4)	1.000	2.913
Na11	0.3533(4)	0.1563(6)	0.3456(9)	1.000	4.559
Na12	0.3276(4)	0.3321(01)	0.6734(13)	1.000	2.786
Ce	0.1446(0)	0.1360(8)	0.3318(2)	0.030	2.533


a
Na3YSi3O9:0.002Ce3+
b
Na3YSi3O9:0.01Ce3+
c
Na3YSi3O9:0.03Ce3+
d
Na3YSi3O9:0.05Ce3+
e
Na3YSi3O9:0.07Ce3+
f
Na3YSi3O9:0.09Ce3+
λex=270 nm
λex=280 nm
λex=290 nm
λex=300 nm
λex=310 nm
λex=320 nm
λex=330 nm
λex=340 nm
red shift
380 nm
402 nm
386 nm
408 nm
398 nm
418 nm
402 nm
422 nm
404 nm
424 nm
411 nm
431 nm
Intensity (a.u.)
Wavelength (nm)

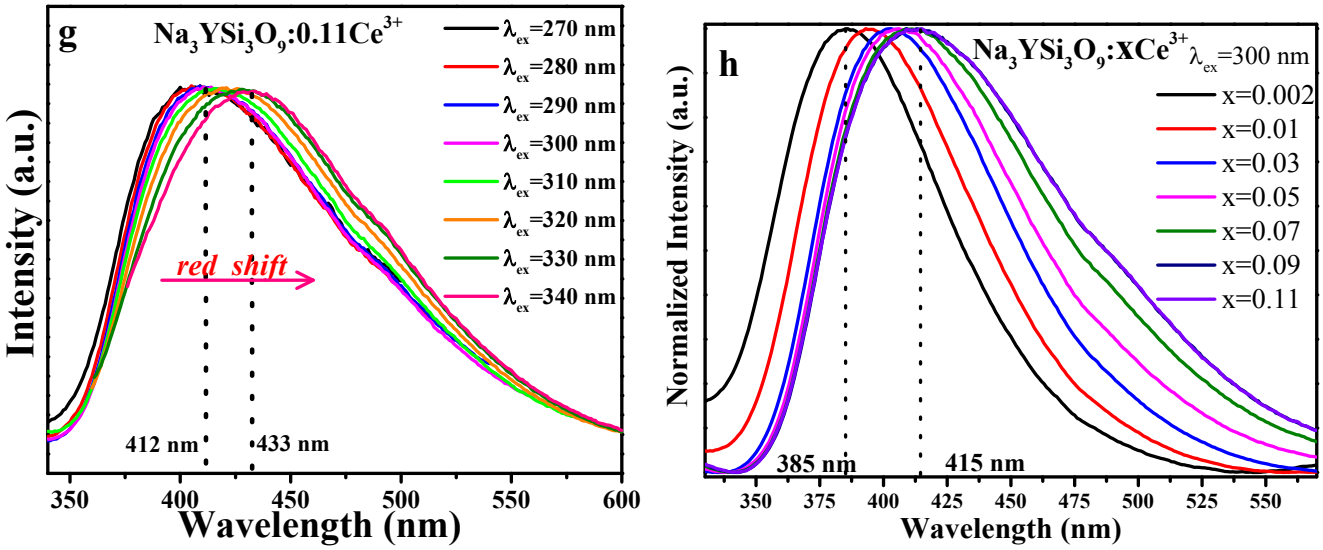


Figure S1: The normalized PL spectra of $Na_3YSi_3O_9$:0.002Ce^{3+} (a), $Na_3YSi_3O_9$:0.01Ce^{3+} (b), $Na_3YSi_3O_9$:0.03Ce^{3+} (c), $Na_3YSi_3O_9$:0.05Ce^{3+} (d), $Na_3YSi_3O_9$:0.07Ce^{3+} (e), $Na_3YSi_3O_9$:0.09Ce^{3+} (f), and $Na_3YSi_3O_9$:0.11Ce^{3+} (g) excited with different excitation wavelength (270 nm-340 nm); (h) The normalized PL spectra of $Na_3YSi_3O_9$:xCe^{3+}excited under 300 nm.

Table S2. Emission peak values with different excitation wavelength for $Na_3YSi_3O_9$: xCe^{3+}.

excitation / emission	270 (nm)	280 (nm)	290 (nm)	300 (nm)	310 (nm)	320 (nm)	330 (nm)	340 (nm)
x=0.002 (nm)	380	382	384	385	385	387	394	402
x=0.01 (nm)	386	390	392	393	395	397	401	408
x=0.03 (nm)	398	400	402	402	405	406	412	418
x=0.05 (nm)	402	403	405	406	409	412	417	422
x=0.07 (nm)	404	406	408	412	414	417	421	424
x=0.09 (nm)	411	412	413	414	418	423	428	431
x=0.11 (nm)	412	413	415	415	418	424	429	433