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Fig. S1.A luminescence picture of a  $Bi_{4(1-x-y)}Si_3O_{12}$ : $Ce^{3+}_{4x}$ ,  $Lu^{3+}_{4y}$  library under a UV excitation ( $\lambda_{ex} = 254$  nm), recorded by a digital camera; A designed doping composition (x,y) map of the same  $Bi_{4(1-x-y)}Si_3O_{12}$ : $Ce^{3+}_{4x}$ ,  $Lu^{3+}_{4y}$  library (unit: mol %).

	1	2	3	4	1	2	3	4
Pr Dy	5	6	7	8	5	6	7	8
	9	10	11	12	9	10	11	12
	13	14	15	16	13	14	15	16
	1	2	3	4	1	2	3	4
	1 5	2 6	3 7	8	1 5	2 6	3 7	8

Fig. S1.(left) A luminescence picture of a  $Bi_{4(1-x)}Si_3O_{12}$ : $RE^{3+}_{4x}$  (RE = Pr, Dy, Tb, Er) library under a UV excitation ( $\lambda_{ex} = 254$  nm), recorded by a digital camera; (right) A designed doping composition (x) map of the same  $Bi_{4(1-x)}Si_3O_{12}$ : $RE^{3+}_{4x}$  (RE = Pr, Dy, Tb, Er) library (unit: mol %).

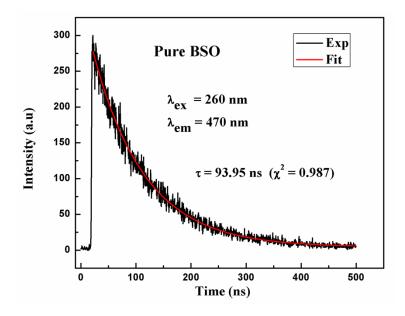


Fig. S2. Decay curves of 460 nm of Bi<sup>3+</sup> emission in Bi<sub>3.84</sub>Si<sub>3</sub>O<sub>12</sub>: Dy<sub>0.16</sub>