Electronic Supplementary Information (ESI)

Facile synthesis, structure, and tunable luminescence properties of novel one-dimensional $Bi_4Si_3O_{12}$ fibers

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Experimental section

Characterizations

The morphology and composition of the as-prepared samples were examined by the cold field scanning electron microscope (JSM-7500, JEOL) with an energy-dispersive X-ray (EDX) spectrum. The crystalline structure of samples were characterized *via* a Bruker D8 Advance X-ray diffractometer (XRD). The actual doping concentrations of Ln^{3+} ions were determined by an Optima 5300DV inductively coupled plasma-optical emission spectrometer (ICP-OES, PerkinElmer, USA). Thermogravimetric (TG) and derivative thermogravimetry (DTG) curves of samples were recorded at air atmosphere by using a Netzsch STA449C apparatus. FT-IR spectra were obtained at the range of 400-4000 cm^{-1}on a NICOLET IS10 spectrometer using KBr tablet technique. Photoluminescence excitation and emission spectra were recorded on a Hitachi F-7000 spectrometer equipped with Xe lamp as the excitation source. Photoluminescence decay measurements and quantum yield were recorded with pulsed 386 nm radiation of Xe-lamp (450 W) as an excitation source using FS5 (Edinburgh, Britain). Lifetimes of the radiative levels were estimated by fitting as exponential function to the decay curves. The color rendering index (CRI) of the as-fabricated LED device was recorded on a high accuracy array rapid spectroradiometer equipped with an integrating sphere (Haas-2000, Everfine Co., Ltd, China). All the measurements were performed at room temperature.

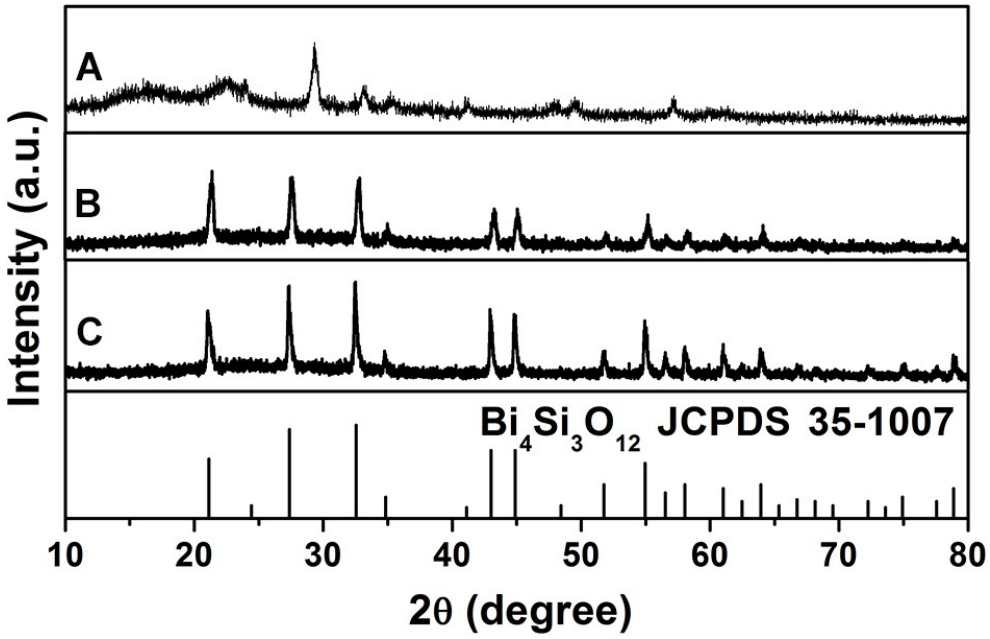

Fig. S1. XRD patterns of the samples calcined at 800 ^{o}C for different time intervals: (A) 3 h, (B) 4 h, (C) 5 h and the standard data of bismuth silicate (JCPDS No. 35-1007) is presented as a reference.

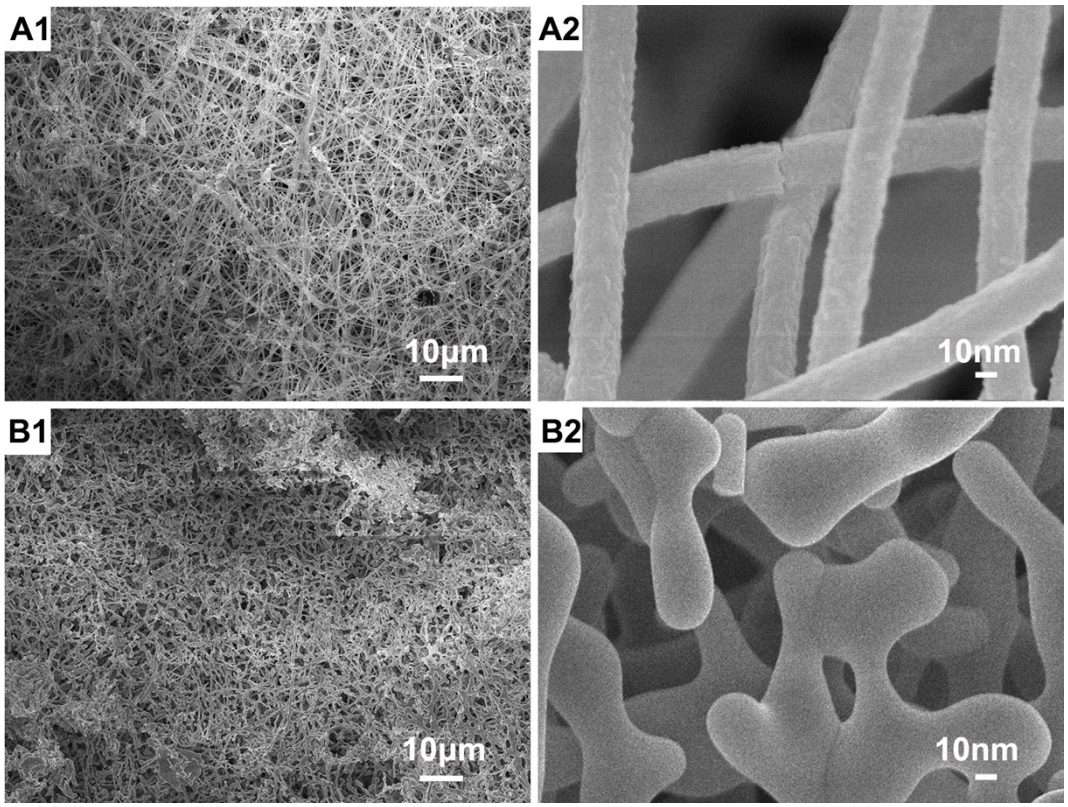

Fig. S2. SEM images of the fibers calcined for 4 h at (A1, A2) 500 ^{o}C and (B1, B2) 900 ^{o}C.

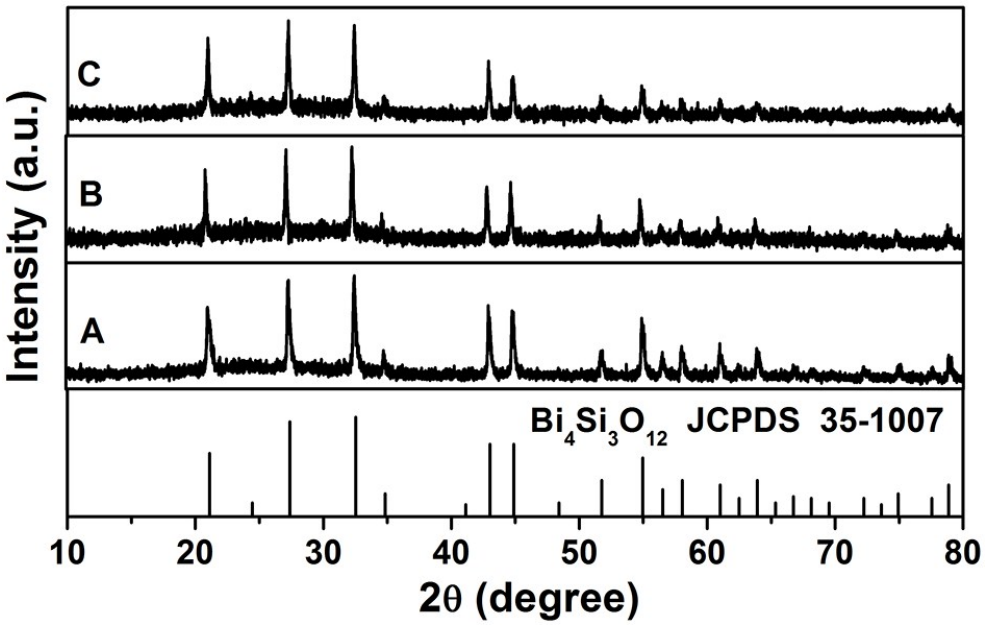

Fig. S3. XRD patterns of (A) pure $Bi_4Si_3O_{12}$, (B) $Bi_4Si_3O_{12}$:5mol%Sm^{3+}, and (C) $Bi_4Si_3O_{12}$:5mol%Dy^{3+} samples and the standard data of bismuth silicate (JCPDS No. 35-1007) is presented as a reference.