

## Supplementary information

### 1. Lattice constant parameter for La-doped BSO

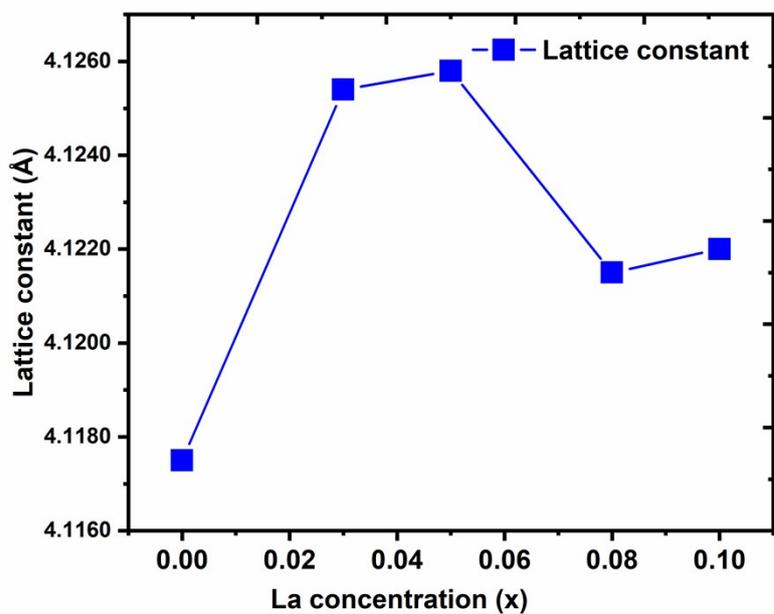


Figure S1. Lattice constant variations of La-doped BSO samples

### 2. HR-TEM images of BSO

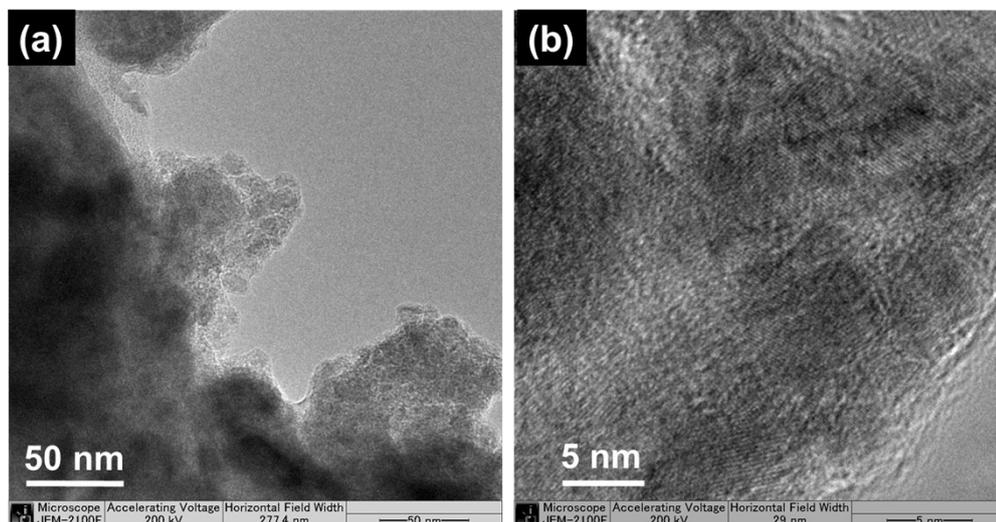


Figure S2. HR-TEM images of BSO polycrystalline samples: (a) low-magnification range (b) high-magnification range

### 3. TEM-EDS analysis of BSOLa10

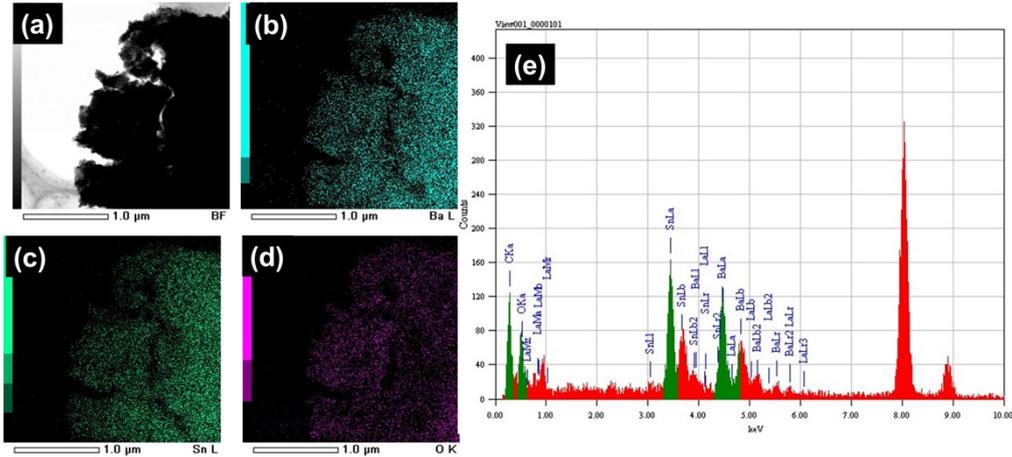


Figure S3. (a-e) STEM-EDS element mapping analysis (a) Bright field TEM image, (b) barium element map, (c) tin element map, (d) oxygen element map, (e) element spectrum

### 4. Survey spectra analysis of La-substituted BSO

The survey spectra of La-substituted BSO as shown in Figure S4. The Ba 3d, Sn 3d, O 1s and La 3d elements peaks confirmed that the all the elements were present in the structure.

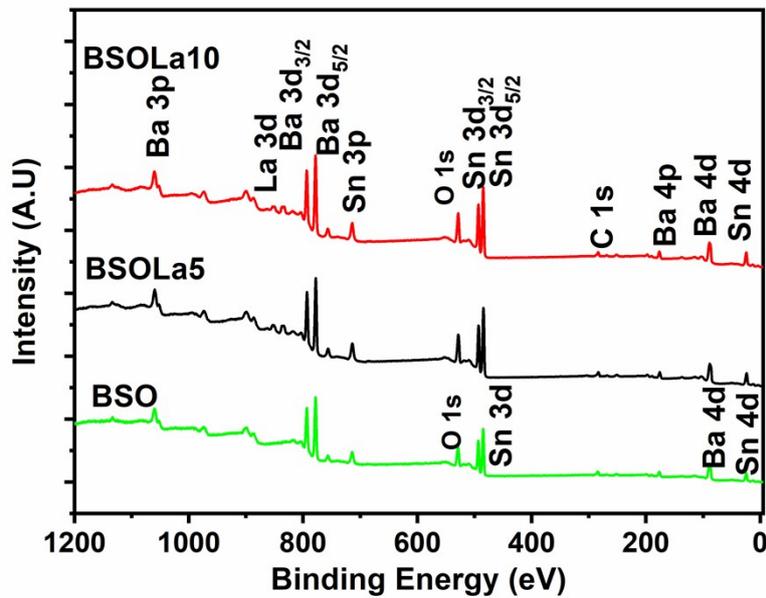


Figure S4. La-doped BSO survey spectra of BSO, BSOLa5 and BSOLa10