

Supplementary Information

In the EDX spectra measurement process, we use the commercial Bi_2S_3 bulk material as a standard sample for correction, which is purchased from the “Strem Chemicals, Inc.” and the purity is 99.999%. For comparison, the EDX spectra were measured with the same instrument parameters (voltage: 300 KeV, tilt angle α :14.99°). The atomic compositions were analyzed using the self carries software of the Tecnai F30.

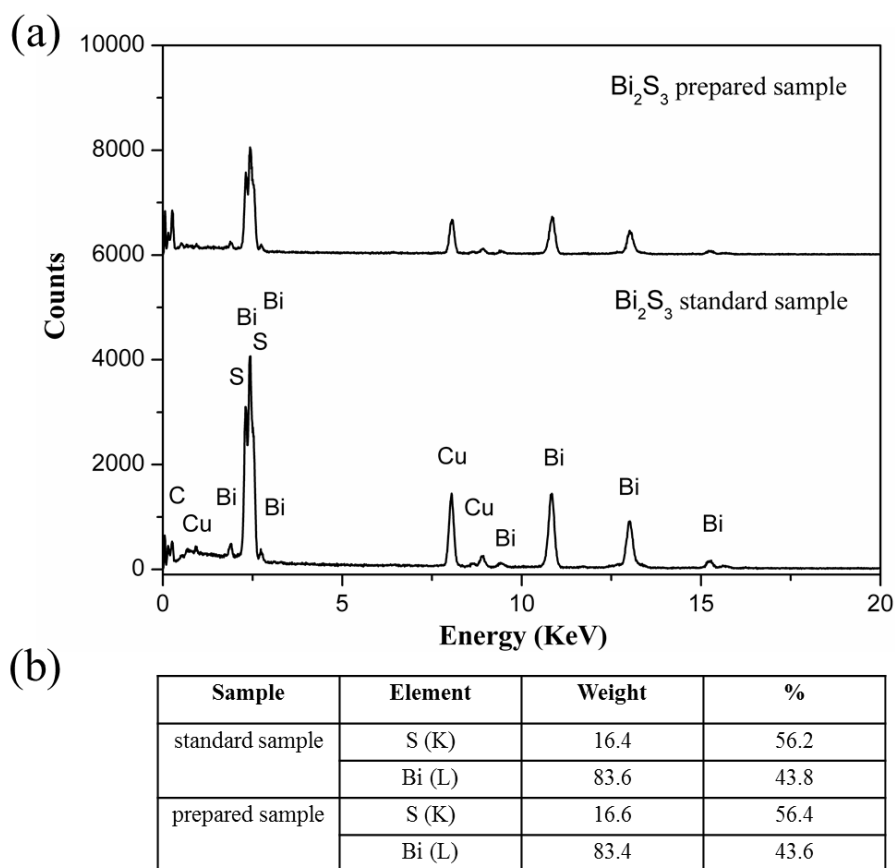


Figure S1. The EDX spectra (a) and the table of compositions (b) of the Bi_2S_3 prepared and standard samples.

From Figure S1(a), it can be seen that only the elements of bismuth and sulfur were detected (the C and Cu signals arise from the TEM grid), and the EDX spectrum of the prepared sample is same to that of the standard sample. As presented in Figure S1(b), the atomic compositions of Bi and S in the standard sample are 43.8% and 56.2%, respectively. Based on the stoichiometric ratio of Bi to S of Bi_2S_3 are 2:3, we

can get the correction factor for S atom is 1.17 under this measurement conditions. Therefore, the actual S atomic compositions in the prepared sample should be 65.9%, and the atom ratio of Bi to S of the prepared sample is 43.6:65.9, that is, 1:1.51, which is very close to the stoichiometric ratio of Bi_2S_3 . The above result shows that the prepared sample with our synthetic approach is the pure Bi_2S_3 material, which is well agreement with the XRD result.

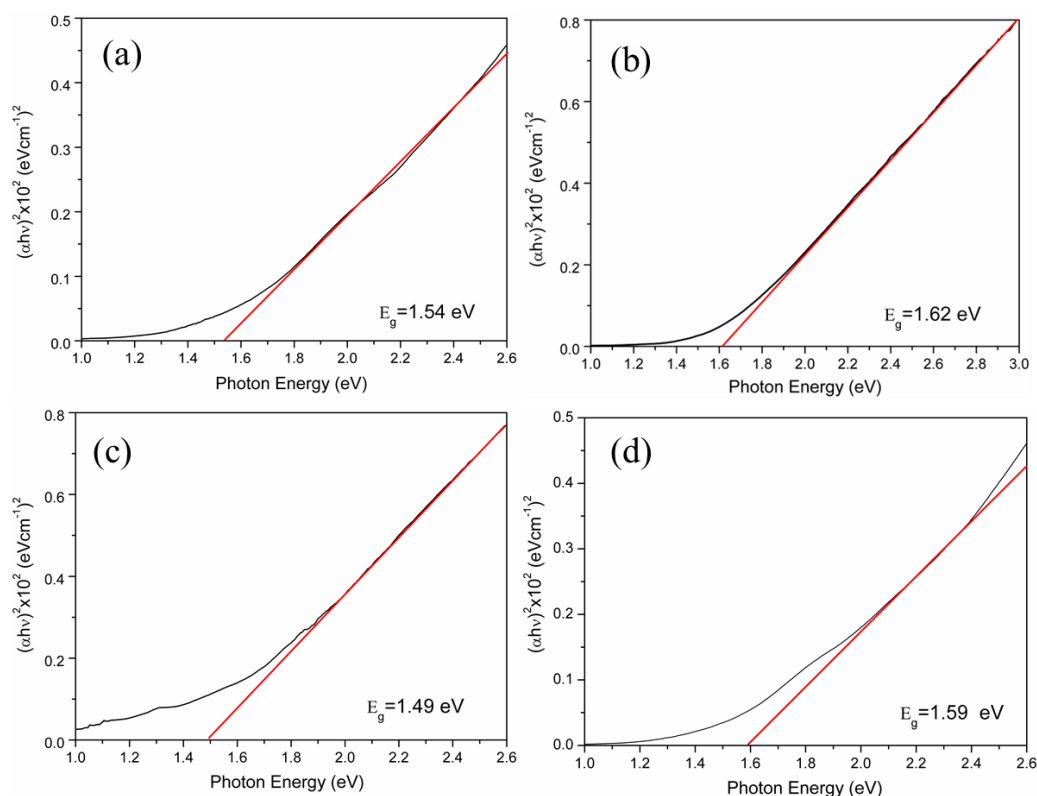


Figure S2. The plot of $(\alpha h\nu)^2$ versus $h\nu$ of Bi_2S_3 micro/nanocrystals, corresponding to reaction solvents are ethylene glycol (a), deionized water (b), ethylene diamine (c) and ethanol (d), respectively.

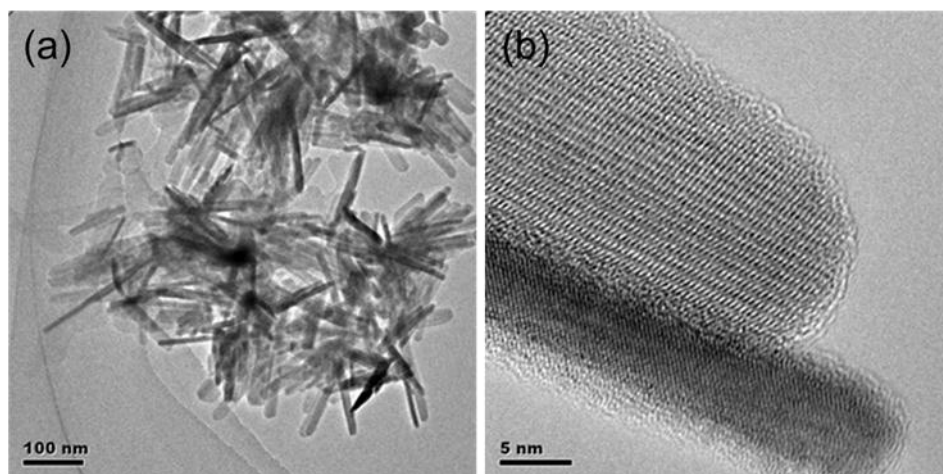


Figure S3. TEM image of Bi₂S₃ nanorods (a), HR-TEM image of some thin Bi₂S₃ nanorods (b).