Supplemental Information

Size-controllable synthesis of Bi/Bi_2O_3 heterojunction nanoparticles using pulsed Nd:YAG laser deposition and metal-semiconductor-heterojunction-assisted photoluminescence

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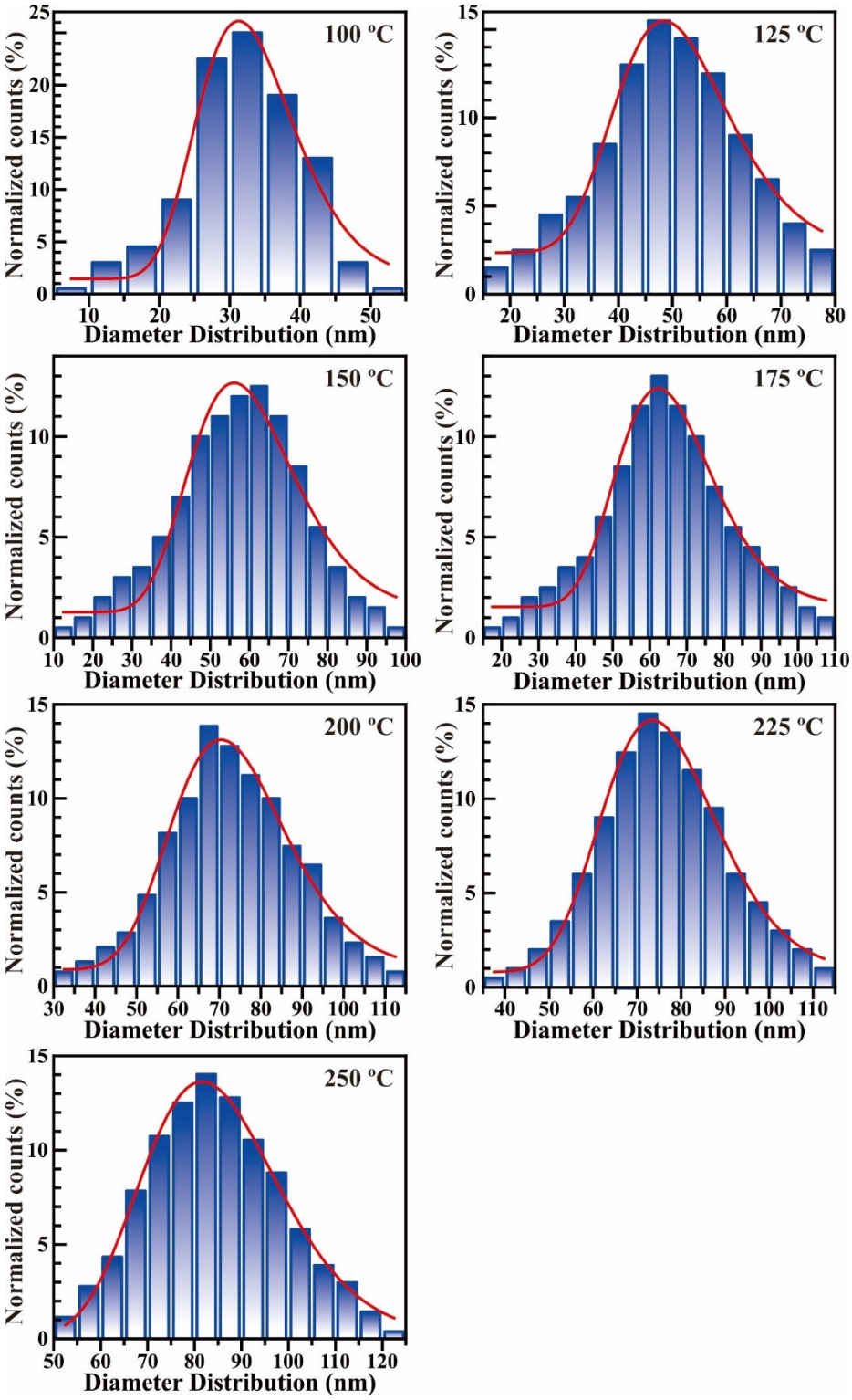

Figure S1. Diameter distribution. Statistical histograms of the diameter distributions of the Bi nanoparticles synthesized at substrate temperatures of 100, 125, 150, 175, 200, 225, and 250 ºC, respectively. The various diameters are fitted to a log-normal distribution function. [32] The fitting parameters of the majority distribution, average diameter, and standard deviation are shown in Table 1.

Substrate temperature	Majority diameter distribution	Average diameter	Standard deviation
100 ºC	25-40 nm	32.78 ±0.59 nm	0.21 ± 0.02
125 ºC	35-65 nm	50.71 ± 0.57 nm	0.21 ± 0.01
150 ºC	40-75 nm	59.34 ± 1.00 nm	0.23 ± 0.02
175 ºC	50-80 nm	64.94 ± 0.60 nm	0.20 ± 0.01
200 ºC	55-90 nm	73.14 ± 0.53 nm	0.19 ± 0.01
225 ºC	60-90 nm	75.78 ± 0.29 nm	0.17 ± 0.01
250 ºC	65-100 nm	84.20 ± 0.38 nm	0.17 ± 0.01

Table 1. The majority diameter distribution, average diameters, and standard deviations of the Bi nanoparticles synthesized at various substrate temperatures for the statistical histograms (see Fig. S1, Supporting Information).

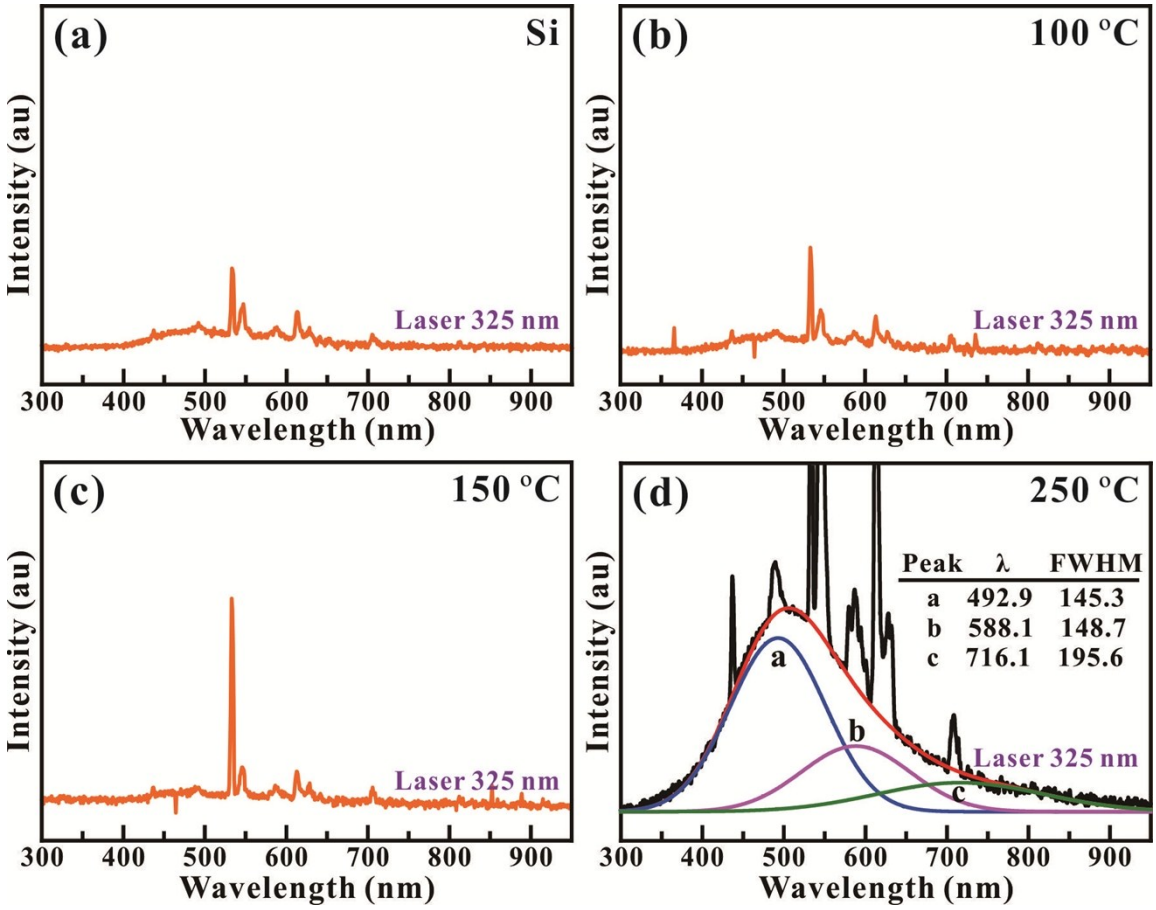

Figure S2. Photoluminescence (PL). Room-temperature PL spectra of (a) the Si substrate and the Bi/Bi_2O_3 heterojunction nanoparticles synthesized at substrate temperatures of (b) 100, (c) 150, and (d) 250 ºC, respectively.

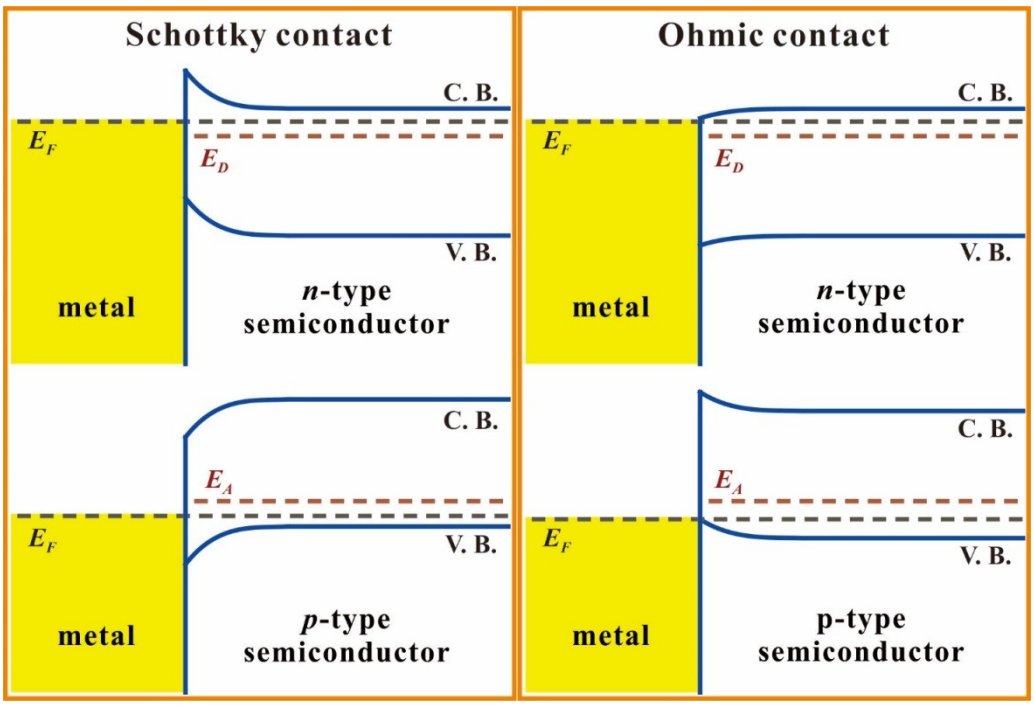

Figure S3. Band structures of metal-semiconductor heterojunctions. There are two kinds of metal-semiconductor heterojunctions, Schottky and Ohmic contacts. However, there are only two types of semiconductors, *n*- and *p*-types, giving four varying metal-semiconductor heterojunctions.