

Supporting Information:

Figure S1 shows the XRD pattern of the sintered Bi_2Te_3 target with indexes (JCPDS 89-4302) scanned in the θ - 2θ configuration. The XRD pattern confirmed the existence and the crystal structure of the single phase Bi_2Te_3 .

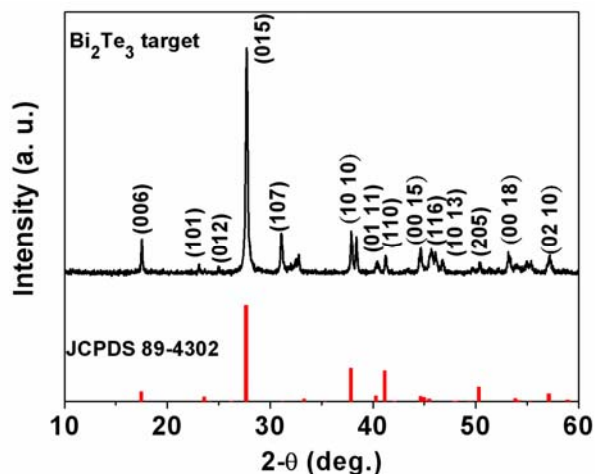


Fig. S1 the XRD pattern of the sintered Bi_2Te_3 target with indexes (JCPDS 89-4302) scanned in the θ - 2θ configuration.

Figure S2 (a) shows the cross section SEM image and reveals a film thickness of ~ 1.1 μm . As can be seen from the top view SEM images, there exists less morphological difference between the thick 0-D nanoparticle film (Fig. S2(b)) and the thinner one (Fig. 1(e)), indicating the thickness independent assembling structure of the present 0-D case.

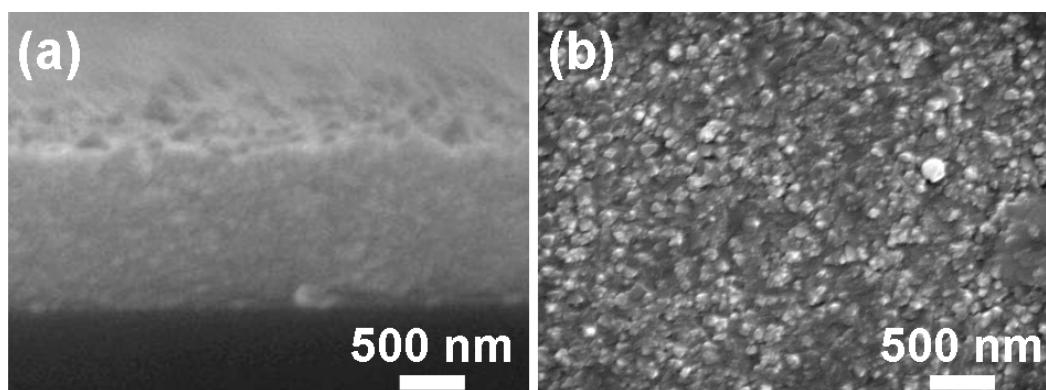


Fig. S2 (a) The cross section and (b) the top view SEM images of the 0-D nanoparticle Bi_2Te_3 film with a film thickness of ~ 1.1 μm .

Most importantly, the features as observed in the current-voltage (I-V) plot (see Fig. S3(a)) and in the Seebeck coefficient plot (n-type semiconductor) (see Fig. S3(b)) of the thicker 0-D film ($\sim 1.1 \mu\text{m}$) are same as the thinner one ($\sim 350 \text{ nm}$). The measured room-temperature resistance, electrical conductivity, Seebeck coefficient, and the corresponding power factor is 190Ω , 219 Scm^{-1} , $-94 \mu\text{VK}^{-1}$, and $1.94 \mu\text{Wcm}^{-1}\text{K}^{-2}$ (see Table S1), respectively. Increase of the film thickness from $\sim 350 \text{ nm}$ to $\sim 1.1 \mu\text{m}$ seems to lead only very slight changes of the thermoelectric related values. Thus, according to these direct experimental evidences, we consider that for 0-D nanoparticle Bi_2Te_3 film, the thickness is not an effective factor for changing or modifying the thermoelectric properties.

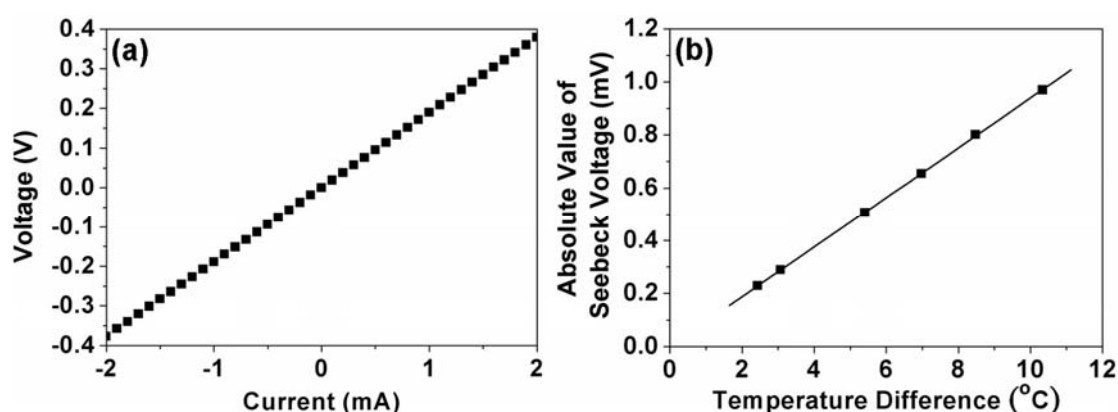


Fig. S3 (a) The I-V curve and (b) the Seebeck voltage plotted as a function of the temperature difference across the 0-D nanoparticle Bi_2Te_3 film with a film thickness of $\sim 1.1 \mu\text{m}$.

Table S1 Room-temperature thermoelectric properties of the 0-D nanoparticle Bi_2Te_3 film with a film thickness of $\sim 1.1 \mu\text{m}$.

Sample name	Electrical conductivity (Scm^{-1})	Seebeck coefficient (μVK^{-1})	Power factor ($\mu\text{Wcm}^{-1}\text{K}^{-2}$)
0-D nanoparticle	219	-94	1.94