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Supporting Information

Nanostructured SnSe Integrated with Se Quantum Dot with Ultrahigh Power Factor and Thermoelectric Performance from Magnetic Field-Assisted Hydrothermal Synthesis

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Table S1. Sample density of 5 T and 9 T Se quantum dot/$Sn_{0.99}Pb_{0.01}Se$ nanocomposites and $Sn_{0.99}Pb_{0.01}Se$ by Archimedes method.

Sample	**Density [g cm^{-3}]**
$Sn_{0.99}Pb_{0.01}Se$	5.93
5 T Se quantum dot/$Sn_{0.99}Pb_{0.01}Se$	5.96
9 T Se quantum dot/$Sn_{0.99}Pb_{0.01}Se$	5.93

Table S2. The lattice parameters extracted from the XRD Rietveld refinement for 5 T and 9 T Se quantum dot/$Sn_{0.99}Pb_{0.01}Se$ nanocomposites and $Sn_{0.99}Pb_{0.01}Se$.

Sample	**Magnetic field intensity**	**a(Å)**	**b(Å)**	**c(Å)**	**Volume(Å^3)**
$Sn_{0.99}Pb_{0.01}Se$	0 T	11.52(5)	4.16(9)	4.44(5)	213.6
Se quantum dot/$Sn_{0.99}Pb_{0.01}Se$	5 T	11.52(8)	4.16(9)	4.44(8)	213.77
Se quantum dot/$Sn_{0.99}Pb_{0.01}Se$	9 T	11.52(4)	4.16(8)	4.45(6)	214.0

Figure S1. EBSD microstructure of 5 T and 9 T Se quantum dot/$Sn_{0.99}Pb_{0.01}Se$ nanocomposites and $Sn_{0.99}Pb_{0.01}Se$. (a), (d) and (g) are band contrast images of $Sn_{0.99}Pb_{0.01}Se$, 5 T and 9 T Se quantum dot/$Sn_{0.99}Pb_{0.01}Se$ nanocomposites, respectively; (b), (e) and (h) are Euler images of $Sn_{0.99}Pb_{0.01}Se$, 5 T and 9 T Se quantum dot/$Sn_{0.99}Pb_{0.01}Se$ nanocomposites, respectively; (c), (f) and (i) are inverse pole figures of $Sn_{0.99}Pb_{0.01}Se$, 5 T and 9 T Se quantum dot/$Sn_{0.99}Pb_{0.01}Se$ nanocomposites, respectively.

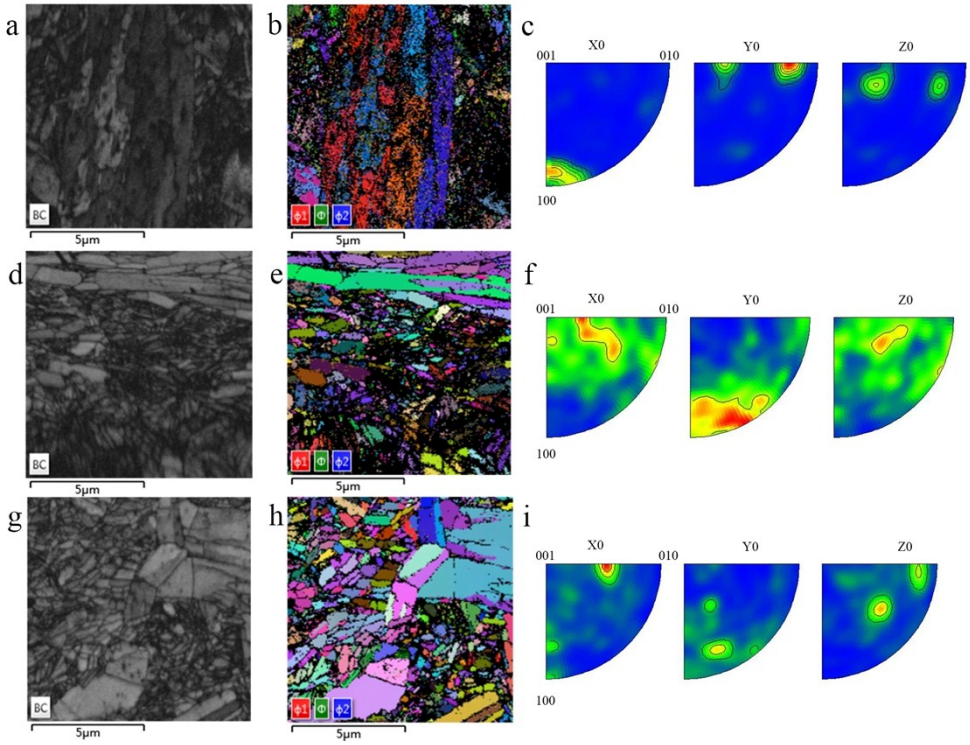

Figure S2. EDS maps of Se, Zn and Pb with corresponding HAADF-STEM image.

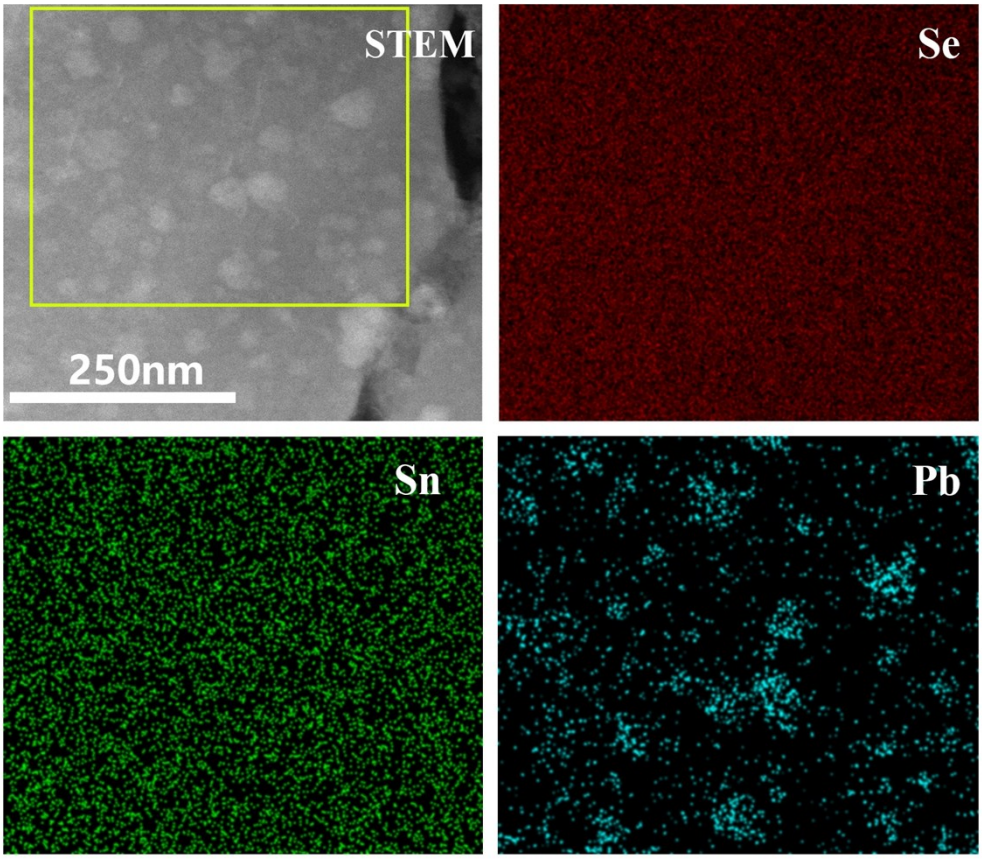

Figure S3. EBSD microstructure of 5 T and 9 T Se quantum dot/$Sn_{0.99}Pb_{0.01}Se$ nanocomposites and $Sn_{0.99}Pb_{0.01}Se$. (a), (c) and (e) are band contrast images of $Sn_{0.99}Pb_{0.01}Se$, 5 T and 9 T Se quantum dot/$Sn_{0.99}Pb_{0.01}Se$ nanocomposites , respectively; (b), (d) and (f) are grain size distribution histograms of $Sn_{0.99}Pb_{0.01}Se$, 5 T and 9 T Se quantum dot/$Sn_{0.99}Pb_{0.01}Se$ nanocomposites, respectively.

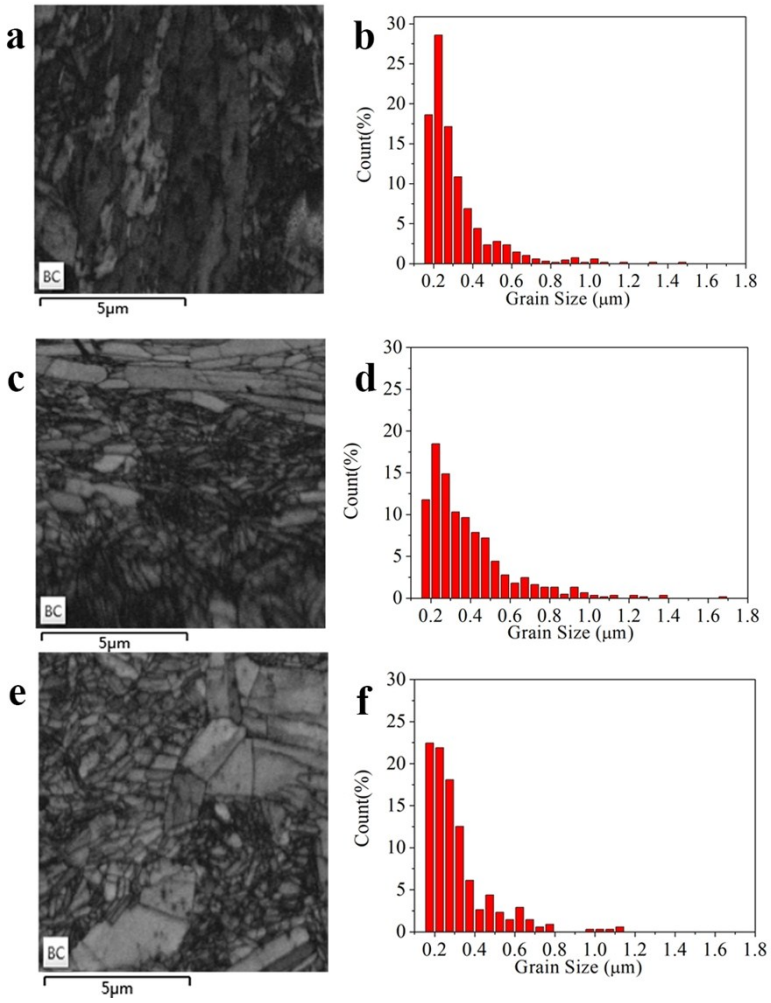

Figure S4. A comparison of electrical properties perpendicular to the direction of pressure and parallel to the direction of pressure for 5 T Se quantum dot/$Sn_{0.99}Pb_{0.01}Se$ nanocomposite. (a) Electrical conductivity (σ). (b) Seebeck coefficient (S). (c) Power factor (PF).

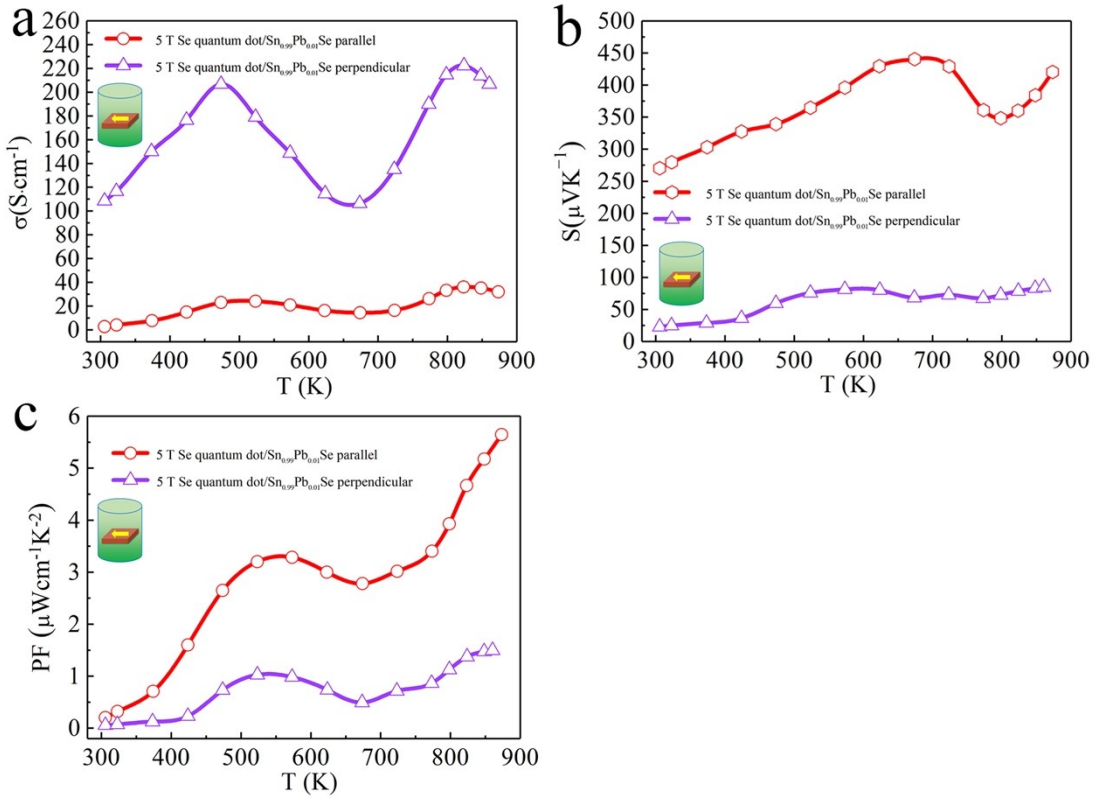
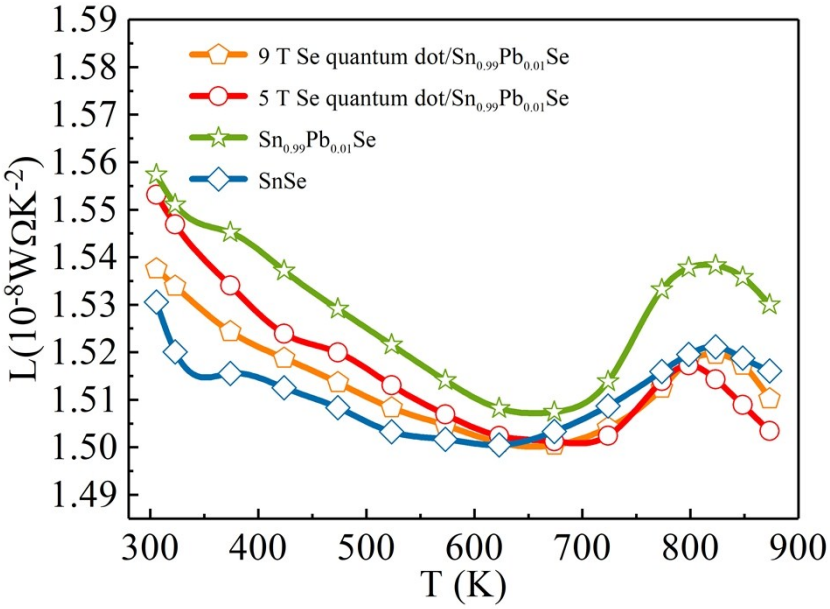
Figure S5. Lorenz number as a function of temperature for 5 T and 9 T Se quantum dot/$Sn_{0.99}Pb_{0.01}Se$ nanocomposites, $Sn_{0.99}Pb_{0.01}Se$ and SnSe.