

Supporting Information for Advances in Atomic Layer Deposition (ALD) Nanolaminate Synthesis of Thermoelectric Films in Porous Templates for Improved Seebeck Coefficient

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The composition and stoichiometry of the samples were observed by energy dispersive X-ray spectroscopy analysis (EDS), shown as figure s1. The result from EDS reveals the chemical element composition in PbTe and PbSe films grown at 150 °C with 1000 ALD deposition cycles. Table s1 lists the element compositions in PbTe and PbSe samples. Both PbTe and PbSe are slightly non-stoichiometric being Pb rich, which indicates the PbTe and PbSe films are n-type semiconductors, and electrons are the charge carriers.

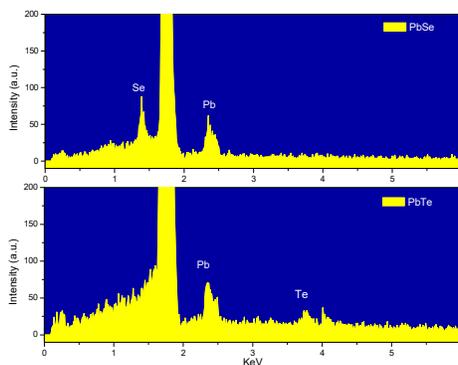


Figure S1. Energy dispersive X-ray Spectroscopy analysis (EDS) of a PbSe film deposited with 1000 ALD cycles and of a PbTe samples grown with 1000 ALD deposition cycles [1].

The Seebeck coefficient of PbTe/PbSe nanolaminates grown on porous silicon templates along cross-plane direction was measured by IR Seebeck Characterization Systems at MicroXact, Inc. Figure s2 displays voltage and temperature response to infrared heat pulse at room temperature for PbTe/PbSe nanolaminates grown on planar and porous silicon templates.

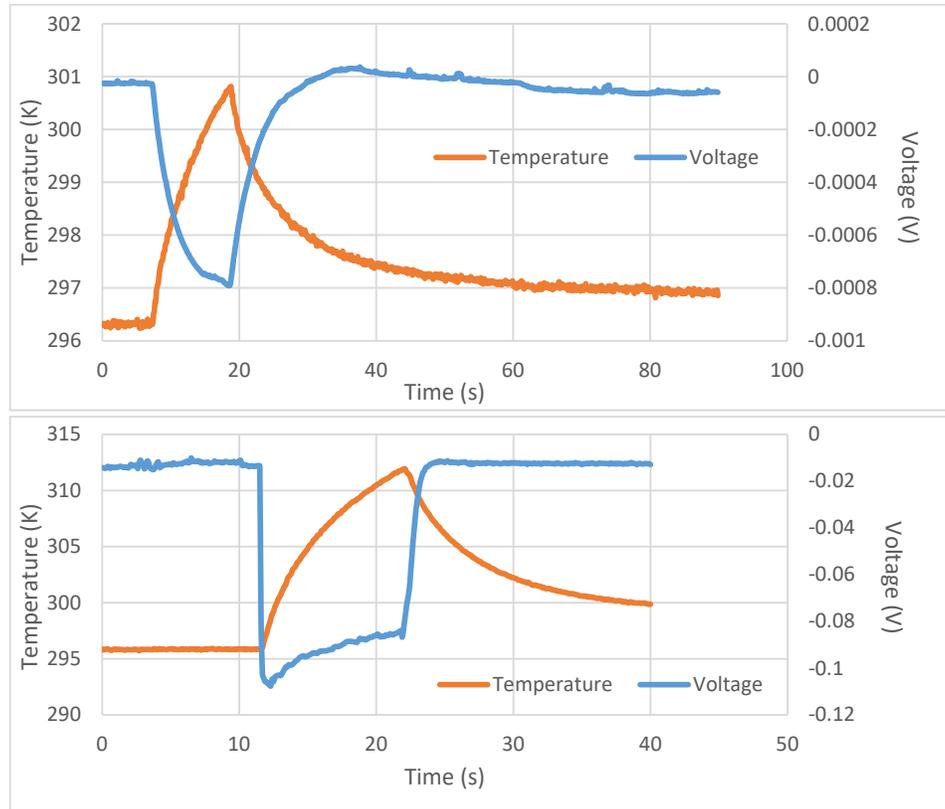


Figure S2. Voltage and temperature response to infrared heat pulse at room temperature for PbTe/PbSe (10 / 10 nm) (a) grown on planar Si substrates and (b) on porous Si templates [2].

Table S1. The composition of lead, tellurium and selenide in PbTe and PbSe films [1]

Samples	Pb (Weight %)	Te (Se) (Weight %)	Pb (Atom %)	Te (Se) (Atom %)
PbTe (1000cys-170 °C)	6.53±1.61	1.98±0.22	0.86±0.21	0.42±0.05
PbSe (1000cys-170 °C)	12.07±0.81	3.68±0.26	1.88±0.13	1.5±0.1

1. Chen, X., et al., *Seebeck Coefficient Enhancement of ALD PbTe/PbSe Nanolaminate Structures Deposited inside Porous Silicon Templates*. ECS Journal of Solid State Science and Technology, 2016. **5**(9): p. P503-P508.
2. Chen, X., *Enhancement of Thermoelectric Properties of ALD Synthesized PbTe and PbSe by Phonon Engineering*. 2017: Old Dominion University.

