Abstract Submitted
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Nitride Metal-Semiconductor Superlattices for Solid State Thermionic Energy Conversion ROBERT WORTMAN, JEREMY SCHROEDER, POLINA BURMISTROVA, Birck Nanotechnology Center, Purdue University, MONA ZEBARJADI, ZHIXI BIAN, ALI SHAKOURI, Department of Electrical Engineering, UC Santa Cruz, TIMOTHY SANDS, Birck Nanotechnology Center, Purdue University — A new class of thermoelectric materials based off of superlattices have been proposed that show a potential for enhanced thermoelectric performance[1,2]. The increase of thermoelectric figure-of-merit ZT of these materials is due to both the energy filtering effect of the Schottky barriers as well as the reduced thermal conductivity that results from increased interface density. Our work has centered on the metal-semiconductor materials system of HfN-ScN. These are both high temperature materials ($T_m > 2500$C). They have the same rocksalt crystal structure and similar lattice constants, allowing epitaxial growth. We have grown superlattices of these materials via DC magnetron sputtering. Results from x-ray diffraction, and electrical and thermal tests will be presented. Their potential as thermoelectric energy conversion materials will be discussed. 1 G. D. Mahan et al, Phys. Rev. Lett., 80, 4016 (1998) 2 D. Vashaee et al, *Phys. Rev. Lett.* 92, 106103 (2004)

Robert Wortman
Birck Nanotechnology Center, Purdue University

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