

Abstract Submitted
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Nanostructured YbAgCu₄ for potential cryogenic thermoelectric cooling MACHHINDRA KOIRALA, HUI WANG, Department of Physics and TcSUH, University of Houston, Houston, TX, 77204, MANI POKHAREL, CYRIL OPEIL, Department of Physics, Boston College, Chestnut Hill, MA, 02467, ZHIFENG REN, Department of Physics and TcSUH, University of Houston, Houston, TX, 77204 — We have studied thermoelectric properties of nanostructured YbAgCu₄ for cryogenic temperature range. Nanostructured YbAgCu₄ has been prepared using arc melting method followed by ball milling and hot pressing process. Thermal conductivity of the nanostructured samples has been reduced at 42 K by 30-50 % compared to the previously reported value. A high power factor of 131 $\mu\text{W m}^{-1} \text{K}^{-2}$ has been obtained at 22 K. A peak dimensionless figure of merit ZT of 0.11 has been achieved at 42 K. With the variation of Cu-Ag composition, the temperature of peak ZT can be tuned, which could be useful for the preparation of segmented legs. The method of nanostructuring can be implemented with different heavy fermions for obtaining high power factor with reduced thermal conductivity.

Machhindra Koirala
Department of Physics and TcSUH,
University of Houston, Houston, TX, 77204

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