

Abstract Submitted
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High Thermoelectric Power Factor in $\text{CoSi}_{1-x}\text{B}_x$ Alloys¹ HUI SUN, DONALD MORELLI, Michigan State University — $\text{CoSi}_{1-x}\text{B}_x$ alloys with x ranging from 0 to 0.1 have been prepared by an arc melting and annealing procedure. X-ray diffraction studies suggest the occurrence of minor CoB phase when $x \geq 0.05$. The thermoelectric (TE) properties were measured from 80 to 300K. The samples with $x \leq 0.02$ showed much lower electrical resistivity than CoSi. The Seebeck coefficient was negative for all samples over the investigated temperature range, indicating dominant transport by electrons in this temperature range. A high TE power factor ($70 \mu\text{W}/\text{K}^2\text{cm}$ at room temperature) was obtained in $\text{CoSi}_{0.98}\text{B}_{0.02}$, which we ascribe to the appropriate tuning of the Fermi level near the pseudogap in the density of states. In optimized samples the dimensionless figure of merit is in excess of 0.13 due to this enhanced power factor. We will also report on our efforts to further increase the figure of merit by thermal conductivity reduction methods.

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