Abstract Submitted
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**Enhanced thermoelectric properties of $YbCo_2Zn_{20}$ through Fe and Ni Doping**[1] JORGE R. GALEANO-CABRAL, NHMFL; Florida State University, BENNY SCHUNDELMIER, OLATUNDE OLADEHIN, Physics Department, Florida State University, JUAN ORDONEZ, FAMU-FSU College of Engineering, Florida State University, RYAN BAUMBACH, KAYA WEI, NHMFL; Florida State University — Thermoelectricity allows direct conversion of thermal to electrical energy and vice versa. Promising thermoelectric properties have been reported for single crystals of $YbTM_2Zn_{20}$ ($TM$ = Co, Rh, Ir) at low temperatures [1]. In this study, we report further enhanced thermoelectric properties of $YbCo_2Zn_{20}$ by introducing Fe and Ni on the Co site. Doping on the transition metal site directly affects the electrical conductivity. In addition, it allows for tuning the hybridization strength of the $f$-electron states by modifying the distance between the Yb atoms, resulting in improved Seebeck coefficient values. Having optimized electrical conductivity and Seebeck coefficient led to an enhanced thermoelectric figure of merit ($ZT$), which reflects the energy conversion efficiency of thermoelectric devices. We will also elaborate on the manufacturability of a thermoelectric device using these compounds and discuss potential thermal evaluations on the performance of such devices. [1] Wei, et. al. Sci. Adv. 5, eaaw6183 (2019).

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