Abstract Submitted
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Effect of tuning hybridization strength on optimizing the Seebeck coefficient of heavy fermion compounds $Ce_xSm_yYb_zIr_2Zn_{20}$ (x + y + z = 1)[1] BENNY SCHUNDELMIER, JORGE GALEANO CABRAL, KEKE FENG, OLATUNDE OLADEHIN, RYAN BAUMBACH, KAYA WEI, Florida State University — Efficient electrical production utilizing thermoelectric generators is becoming more feasible. Thermoelectricity is a two-way direct conversion between thermal energy and electrical power. Recently, 1-2-20 compounds have shown promising thermoelectric properties, especially at low temperatures. [1] In a typical 1-2-20 compound, the heavy rare earth elements are encompassed by large cage-like structures which provides an avenue for achieving reduced lattice component of the thermal conductivity. On the other hand, the strongly hybridized f-electron states contribute to large Seebeck coefficient values. Here we report the optimization of thermoelectric properties of heavy fermion compounds $Ce_xSm_yYb_zIr_2Zn_{20}$ (x + y + z = 1). By introducing different rare earth elements, we can tune the f-electron states at the Fermi level, resulting in enhanced Seebeck coefficient values. We further characterized these materials using magnetometry, EDS, and XRD. We will discuss results demonstrating the correlation between tuning the hybridization strength of the f-electron states and optimizing the thermoelectric properties of these materials. [1] Wei, et. al. Sci. Adv. 5, eaaw6183 (2019).

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Benny Schundelmier
Florida State University

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