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High Temperature thermoelectric properties of $Ba_xYb_yCo_4Sb_{12}$ composites[1] XUN SHI, HUIJUN KONG, CTIRAD UHER, University of Michigan, THERMOELECTRIC TEAM — In materials where the mean free path of charge carriers is smaller than that of phonons, enhancing boundary scattering in the matrix may improve the thermoelectric figure of merit[1]. We have applied this idea to n-type skutterudites that have large effective mass and consequently small carrier mean free path. We prepared double-filled $Ba_xYb_yCo_4Sb_{12}$ skutterudite composites with a wide range of the filling fractions x and y. The experimental filling fraction limits are in a good agreement with the values predicted theoretically. In cases where we intentionally exceeded the filling limit, the excess filler atoms form fine oxide particles that are distributed mainly on the grain boundaries. While the composites maintain good electrical transport properties due to weak charge carrier scattering from the oxide particles, the lattice thermal conductivity is reduced significantly. The highest ZT in these composite skutterudites reaches 1.3 at 800K.

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