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Precipitation anneals in the PbTe-PbS system[1] CHRISTOPHER JAWORSKI, VLADIMIR JOVOVIC, JOSEPH HEREMANS, The Ohio State University — Bulk samples of $(PbS)_x(PbTe)_{1-x}$ have been prepared in the range 4%<x<15%. There is a miscibility gap in the pseudo-binary PbTe/PbS phase diagram that enables the precipitation of a PbS-rich phase in a PbTe-rich matrix. To that effect, the samples were compounded in the liquidus, and then quenched, resulting in a supersaturated solution. Conditions for precipitation anneals were then developed, and samples with nano-precipitates of a PbS-rich phase in a PbTe-rich parent phase have been obtained, as evidenced by X-ray diffractions. This technique, previously applied to Pb-rich PbTe,[1] is aimed at creating a bulk material containing a substantial fraction of nanometer-sized particles in order to mimic the morphology of quantum-dot superlattices that reached very high values of the thermoelectric figure of merit.[2] Preliminary thermoelectric and thermal conductivity data will be presented, along with galvanomagnetic and thermomagnetic data aimed at identifying the electronic properties of the materials. [1] J. P. Heremans, C. M. Thrush and D. T. Morelli, Thermopower enhancement in PbTe with Pb precipitates, J. Appl. Phys. **98** 063703 (2005 [2] T. C. Harman, M. P. Walsh, B. E. LaForge, and G. W. Turner, J. Electron. Mater. **34**, L19 (2005).

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