Abstract Submitted
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**Galvanomagnetic and Thermoelectric Properties of $Bi_2Se_{3-x}S_x$ Prepared by Spark Plasma Sintering and Annealing**[1] BIN HE, YI-BIN GAO, 1 Department of Mechanical Engineering, The Ohio State University, Columbus, OH, JOSEPH P. HEREMANS, 1 Department of Mechanical Engineering, The Ohio State University, Columbus, OH; 2 Department of Physics, The Ohio State University, Columbus OH — $Bi_2Se_3$ belongs to the tetradymite class of semiconductors, many of which are known thermoelectric materials. $Bi_2Se_3$ has intrinsic Se vacancies that tend to make it n-type, and the conduction band density of states (DOS) is too low to give a high ZT. Here sulfur is added to pure $Bi_2Se_3$ in order to increase the DOS and reduce vacancy concentration. A group of $Bi_2Se_{3-x}S_x$ samples are prepared by SPS, with x varying from 0% to 10%. The samples are cut into halves, with one half measured directly and the other annealed before measurement. Thermoelectric properties are measured from 80K to 420K. The Seebeck coefficient increases after annealing while the Hall measurements show the carrier concentration to drop from about $10^{19}/cm^3$ to about $10^{18}/cm^3$. The DOS increases a little with x, as expected, and the best power factor reached is about 16 $\mu W/cmK^2$. While the electron concentration can thus be controlled, further work is needed to increase the conduction band DOS more.

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