Abstract Submitted
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Specific Heat and Thermoelectric Power of Germanane[1] BIN HE, Department of Mechanical Engineering, the Ohio State University, Columbus OH, 43210, NICHOLAS CULTRARA, Department of Chemistry and Biochemistry, the Ohio State University, HYUNGYU JIN, Department of Mechanical Engineering, the Ohio State University, LUCAS LINDSAY, Materials Science and Technology Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831, DAVID BROIDO, Department of Physics, Boston College, Chestnut Hill, Massachusetts 02467, JOSHUA GOLDBERGER, Department of Chemistry and Biochemistry, the Ohio State University, JOSEPH HEREMANS, Department of Mechanical Engineering and Department of Physics, the Ohio State University — Germanane(GeH) is a new two-dimensional hydrogen-terminated germanium graphane analogue semiconductor that has been successfully synthesized only recently [1]. We will report on the temperature dependence of the specific heat Cp of GeH from 2K to 300K. The specific heat differs considerably from the Debye model for the parent three-dimensional solid Ge. At low temperature, Cp follows a power law that approaches a T^3 law, but no saturation to a Dulong-Petit value is observed up to 300 K. Errors of this experiment mainly come from mass uncertainty. Theoretical calculation of the phonon spectra will be shown, and the calculated specific heat compared to the experimental one. The calculated Debye temperatures for the different modes are higher than 400 K, which is above the temperature where the material becomes amorphous. The thermopower of p-type doped material will also be reported.

[1] E. Bianco & al., ACS Nano 7 4414-4421 (2013).

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