

Abstract Submitted
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Influence of vapor annealing on the electrical properties of chalcogenide misfit layered compounds¹ SARA TEPFER, Department of Chemistry, University of Oregon, 97403, QIYIN LIN, Department of Physics, University of Oregon, 97403, COLBY HEIDEMAN, NGOC NGUYEN, MATT BEEKMAN, DAVID JOHNSON, Department of Chemistry, University of Oregon, 97403 — A new class of semiconducting misfit layered compounds $[(\text{PbSe})_{0.99}]_m(\text{WSe}_2)_n$ have been prepared. These thin film materials show promise for thermoelectric applications due to their extremely low thermal conductivities. To fully assess the potential these materials hold, a thorough understanding of electrical transport properties must be obtained. Toward this end, we have conducted a systematic study of the compound $[(\text{PbSe})_{0.99}]_1(\text{WSe}_2)_1$ by annealing under controlled Se vapor in order to reduce defect levels and tune chemical composition. Both annealing temperature and time were found to have a significant influence on the electrical properties of the specimens. Carrier concentrations are reduced and carrier mobilities are increased upon annealing. These results could be attributed to defect diffusion and compositional tuning resulting from the annealing conditions and indicate the capacity for reproducible electrical properties.

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Sara Tepfer
Department of Chemistry, University of Oregon, 97403

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