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Modeling the Thermal Conductivity of Hybrid Perovskites MATTHEW S. SLODOV, JEFFREY S. DYCK, Dept. of Physics, John Carroll University, ROBERT STANEK, ANTON KOVALSKY, CLEMENS BURDA, Dept. of Chemistry, Case Western Reserve University — Hybrid perovskites are crystals with a specific structure made up of both organic and inorganic components. These crystals have shown potential to make more efficient solar cells, but their physical properties are not well understood. The properties of these crystals were studied through modeling their thermal conductivity as a function of temperature. The Debye model for thermal conductivity was used as a basis for the modeling. Specifically, the perovskites Methylammonium Lead Iodide, Bromide, and Chloride ($MAPbX_3$, X = I, Br, Cl) and their physical properties of point defects, Umklapp phonon scattering, and grain boundary size were studied. From the samples provided, $MAPbI_3$ had the most point defects, and MAPbBr3 had the greatest Umklapp scattering. More research is required to better understand these perovskites and implement them in technology. We gratefully acknowledge John Carroll University in supporting this research.

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