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Measuring Thermal Processes of Methylammonium Lead Iodide ($CH_3NH_3PbI_3$) Perovskite ANTON KOVALSKY, LILI WANG, Case Western Reserve University, GAGE MAREK, John Carroll University, XIN GUO, CLEMENS BURDA, Case Western Reserve University, JEFFREY DYCK, John Carroll University, CASE WESTERN UNIVERSITY COLLABORATION, JOHN CARROL UNIVERSITY COLLABORATION — Perovskites have recently been the focus of much research due to their performance as a photosensitizers for solar energy conversion applications. We have explored the thermal properties of this material, focusing on the role of the cation methylammonium within the perovskite lattice. Temperature-dependent thermal conductivity of the perovskite in the range between 7K and 300K was compared to the cesium perovskite analog, and the data were fitted to a Debye model, revealing the effect of the methylammonium component on phonon scattering and a source of increased thermal resistance. Thermal conductivity was also measured for naturally aged perovskite samples, showing that the degradation product's thermal behavior approaches that of lead iodide, one of the thermodynamic end products. Our results highlight the effectiveness of thermal transport measurements for analyzing material integrity of perovskite-based devices.

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