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Optical and Dielectric Constants of Organic-Inorganic Metal Halide Perovskites Thin Films¹ TRAVIS MAENLE, KHAGENDRA BHANDARI, Ohio Northern University — Understanding of the complex dielectric function (refractive index) of MAPbI₃ (CH₃NH₃PbI₃) perovskite thin film is essential for designing photovoltaic devices, light emitting diodes and lasers. Keeping this in mind, the complex dielectric functions of MAPbI₃ thin films at room temperature are investigated using optical reflectance spectra of perovskite thin films. The optical reflectance spectra are measured over the energy range of 1.24 eV to 4.13 eV. The phase $\theta(\omega)$ of the reflected wave is computed using the Kramers-Kronig dispersion relation between the real and imaginary parts of the complex function. Our results show that the absorption coefficient (α), refractive indices (n, κ), real and imaginary components of the dielectric constants (ϵ_1, ϵ_2) of the MAPbI₃ thin films are basically independent of the thicknesses of the films. We also compare α with experimentally calculated result. Our results agree well with previously reported results of the absorption coefficient and are consistent with Kramers-Kronig transformations.

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