Optical Constants and Extinction Efficiency of Solid Materials

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The emergent spectrum of star is determined by the transfer of radiation through the matter in the outer layers of the star. Scattering and absorption of radiation by grains is very efficient. Calculation of extinction efficiency is very important application to the study of the formation and evolution of small stars and large planets, including Jupiter and Saturn in our solar system, the formation and structure of stellar winds, and the properties of the interstellar medium. Especially, when we consider about interstellar grains, extinction efficiency provides essential clues to understanding astrophysical phenomena.

We focused on the low temperature ($T_{\rm eff} \approx 2000\,K$) extinction efficiency condensed absorbers over a wide range of temperatures, we searched the literature to obtain optical constants for as many materials as possible. As a result of the search, we compute the extinction efficiency of 27 different kinds of species with 37 different data sets. Likewise, the values of the optical constnats change with how scientsists measure (parallel or perpendicular), temperature, or a particle size. We examined how different values of the optical constants affect to the extinction efficiency calculation.

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