

Crystalline and Amorphous Dust Grains in AGB Stars

Kyung-Won Suh, Jae Woo Lee & Hak-Youn Kim

Department of Astronomy and Space Science,

Chungbuk National University

We have investigated optical properties of the crystalline and amorphous dust grains in the envelopes around O-rich asymptotic giant branch (AGB) stars paying close attention to the infrared observations of the stars including the new Infrared Space Observatory (ISO) data and the new laboratory-measured optical data of the candidate dust grain materials. Using opacity functions for various mixture of amorphous and crystalline grain materials, we have modeled the dust shells with silicate and ice grains. We have compared the radiative transfer model results with the observed spectral energy distributions (SEDs) of the stars including the IRAS PSC, IRAS LRS, and ISO data. We find the evidence of crystalline silicate grains for high mass-loss rate AGB stars but virtually no evidence for low mass-loss rate AGB stars. This could confirm the idea that crystalline silicates form only in cool, dense outer shells around high mass-loss rate O-rich AGB stars.