

Lifecycle of dust grains in the interstellar medium

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While processing of dust grains in the interstellar medium (ISM) has been investigated theoretically, it has not been studied observationally until the advent of the recent infrared satellite missions, *Spitzer*, *Herschel*, and *AKARI*. Several studies with these satellites suggest that a large fraction of dust grains are formed in dense ISM regions rather than stellar sources and they are subsequently processed and altered to a more invulnerable form in the ISM in a galactic scale. In particular, observations of aromatic emission features, which are generally attributed to polycyclic aromatic hydrocarbons or related materials, clearly indicate the variations in the size distribution and the properties of dust grains with different physical environments for the first time. Recent theoretical and observational studies suggest that fragmentation or shattering is a more efficient process than evaporation as interstellar processing, which changes the size distribution of dust grains. In this review, the latest observations of dust processing in the ISM with recent infrared satellites are reviewed together with theoretical implications.