AKARI observations of massive star-forming regions indicative of large-scale cloud-cloud collisions

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The formation process of massive stars is still poorly understood, although many studies on massive star formation processes have been performed. One of compelling scenarios is a large-scale cloud-cloud collision which leads to an effective gas compression triggering massive star-formation activities. Many pieces of observational evidence for cloud-cloud collisions have been found in massive star-forming regions by CO observations with NANTEN/NANTEN2 radio telescopes. Infrared observations of such star forming regions would provide information on dust and polycyclic aromatic hydrocarbons (PAHs) which absorb ultraviolet photons emitted from young massive stars. The total dust emission indicates the energy of embedded energy sources in the regions. Because PAH emission indicates the distribution of photo-dissociation regions (PDRs) as boundary of heating sources and molecular clouds, we can reveal complicated geometry of star-forming regions.

Among the massive star-forming regions indicative of large-scale cloud-cloud collisions, we carry out mid- and far-infrared surface photometry toward RCW 38, RCW 49, NGC 6334 and NGC6357, using AKARI all-sky survey data. Fitting the spectral energy distribution of each pixel and decomposing dust emission into PAHs, warm dust and cold dust, we investigate spatial distributions of these components. From the total luminosity of the dust emission, we estimate the number of embedded massive stars formed in these regions. In particular, we report details of the results on RCW 38 where about ten O-type stars are formed. In this star-forming region, the above three components show spatially distinct distributions, suggesting complicated geometry of the clouds associated with RCW 38.