

Spatial Distribution of Dusts in the Circumstellar Shell of R Cas

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Mass-loss from evolved stars plays an important role in galactic chemical evolution. Dust grains form in the outer layer of the stellar atmosphere, and accelerate the mass-loss wind due to radiation pressure from the central star. The dust formation condition around an evolved star may be affected by the change of mass loss rate and abrupt thermal events. Compositions and amounts of dusts should vary with such changes of the dust formation condition. Therefore, the dust distribution around evolved stars should preserve time-dependent dust formation processes.

Corundum (Al_2O_3) is one of the earliest condensates both in protoplanetary disks and around evolved stars. The presence of presolar corundum grains in chondrites gives a strong evidence of corundum formation in the mass loss winds. Moreover, corundum grains provide their surfaces as heterogeneous nucleation sites for other dust species including major dust species such as Mg-silicates. Formation conditions of silicates are likely to be affected by refractory dust grains [1]. It is thus crucial to clarify spatial distributions of both major silicates and refractory dust grains in a mass loss wind in order to understand the dust evolution around evolved stars.

Previous ground- and space-based observations shows that R Cas, a Mira variable with a period of about 420 days, shows a 13-micron feature with the strong feature of amorphous silicate [2,3], which spreads out up to 3 arcsec in the Q-band [4]. We performed long-slit spectroscopic observations in the *N*-band and imaging observations in the *N*- and *Q*-band of R Cas with Subaru/COMICS in order to investigate the structure and dust distribution of the dust shell around R Cas. We succeeded in detecting a clearly extended dust shell in *N*-band imaging (larger than 1 arcsec). The spectra in the region including the central star well match with the previous observations [2] and the spatially resolved *N*-band spectra were also obtained. We will report preliminary results on the dust distribution around R Cas and discuss the dust evolution around R Cas.

Keywords: dust; mass-loss-wind; spectroscopy; corundum.

References

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