

Dust Formation History around Nova V1280Sco

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ABSTRACT

We present the results of the late time infrared multi-epoch observations of dust forming nova V1280Sco with Cooled Mid-Infrared Camera and Spectrometer (COMICS) on the Subaru telescope, Thermal-Region Camera Spectrograph (T-ReCS) on the Gemini South telescope and the Infrared Camera (IRC) onboard the AKARI satellite, etc. The temperature and mass evolutions of dust formed in the nova wind are examined based on the spectral decomposition of the infrared spectral energy distribution (SED) obtained at each epoch. The SED obtained with Subaru/COMICS at $t=150$ require the double amorphous carbon dust shells' geometry and relatively larger grain size ($>\sim 0.2\mu\text{m}$). The SEDs obtained with Gemini-S/T-ReCS at $t=1272$ and 1616 after the discovery indicate the presence of silicate emission, which cannot be recognized in the SED obtained at $t=150$, over the continuum emission carried by amorphous carbon. The origins of these dust species are discussed taking account of mass ejection history of the nova/white dwarf. The AKARI near-infrared spectrum obtained at $t=940$ days and T-ReCS N-band spectrum obtained at $t=1272$ days have shown the presense of unidentified infrared (UIR) emission features which may well be carried by hydrogenated amorphous carbons rather than PAHs as reported by previous studies of other dust forming novae. However, the T-ReCS N-band spectrum obtained at $t=1616$ days have shown the decrement of these features suggesting the harsh circumstellar environment of novae for the carriers to survive.