

Mid-infrared observations of the dust-forming classical nova V2676 Oph with Subaru/COMICS

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A dust-forming nova V2676 Oph (discovered in Mar 2012) was the first nova to provide evidence of both C₂ and CN molecules during its near-maximum phase and evidence of CO molecules during its early decline phase (Nagashima et al. 2014). The derived carbon- and nitrogen-isotopic ratios in the nova (Kawakita et al. 2015) are consistent with that the nova explosion was hosted by a CO-rich white dwarf (WD) star. To confirm a type of the hosting WD (CO-rich or ONe-rich), we performed the mid-infrared imaging and low-resolution spectroscopic observations of V2676 Oph with COMICS mounted on the Subaru telescope in June 2013 and May 2014 (482 days and 782 days respectively after its discovery). No clear [Ne II] emission line at 12.8 micron was observed. Based on the absence of [Ne II] emission, the WD hosting V2676 Oph is considered a CO-rich WD. Both types of dust grain, carbon-rich and oxygen-rich, were detected on both dates, although this nova is considered as a Carbon-rich (C/O > 1) based on the presence of C₂ observed earlier. The 11.4 micron unidentified infrared emission was also detected on these dates. Non-equilibrium processes are likely to be responsible for the grain formation in the nova.

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