

The ice composition in the disk around V883 Ori revealed by its stellar outburst

Lee, Jeong Eun

Lee, Seokho

Baek, Giseon

Aikawa, Yuri

Cieza, Lucas

Yoon, Sung Yong

Herczeg, Gregory

Johnstone, Doug

Casassus, Simon

© 2019, The Author(s), under exclusive licence to Springer Nature Limited. Complex organic molecules (COMs), which are the seeds of prebiotic material and precursors of amino acids and sugars, form in the icy mantles of circumstellar dust grains ¹ but cannot be detected remotely unless they are heated and released to the gas phase. Around solar-mass stars, water and COMs only sublime in the inner few au of the circumstellar disk ², making them extremely difficult to spatially resolve and study. Sudden increases in the luminosity of the central star will quickly expand the sublimation front (the so-called snow line) to larger radii, as seen previously in the FU Ori outburst of the young star V883 Ori ³. Here, we take advantage of the rapid increase in disk temperature of V883 Ori to detect and analyse five different COMs—methanol, acetone, acetonitrile, acetaldehyde and methyl formate—in spatially resolved submillimetre observations. The abundances of COMs in the disk around V883 Ori