P108a Salt, Hot Water, and Silicon Compounds Tracing Massive Twin Disks

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We report results of ALMA 0.05″-resolution observations toward the O-type proto-binary system IRAS 16547–4247. We present dynamical and chemical structures of the circumbinary disk, circumstellar disks, outflows and jets, illustrated by multi-wavelength continuum and various molecular lines. The multi-band observation allows us disentangle the dust emission and the free-free emission, which have different spectral indices, in frequency and space. We detect salt, silicon compounds, and hot water lines as probes of the individual protostellar disks at a scale of 100 au, which are complementary to hot-core molecules tracing the circumbinary structures on a 1000-au scale (Tanaka, Zhang et al. 2020). The H_2O line tracing inner-disks has an upper-state energy of $E_u/k > 3000$ K, indicating a high temperature of the disks. On the other hand, despite the detected transitions of NaCl, SiO, and SiS not necessarily having high upper-state energies, they are enhanced only in the vicinity of the protostars. We interpret that these molecules are the products of dust destruction, which only happens in the inner disks. These new results suggest these "hot-disk" lines have great potential for future research of disks in massive start formation. We also tentatively find that the twin disks are counter-rotating, which might give a hint of the origin of the massive proto-binary system IRAS 16547–4247.