AKARI observation of ice in protoplanetary disks

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In outer region (r > several AU) of protoplanetary disks, a significant amount of Carbon, Nitrogen and Oxygen exists in the form of molecular ice such as H_2O, CO, CO_2, and NH_3 on the grain surface. These ices are raw material of comets, and would provide volatiles to form the atmosphere of terrestrial planets. Observing the ice in protoplanetary disks along evolutionary sequence (i.e. from Class 0 to Class II), we can investigate the composition and abundance of ice, and reveal chemical processes in planetary system formation.

We have carried out near-infrared (NIR) spectroscopic observation of protoplanetary disks using *AKARI* satellite. The NIR wavelength region (2.5-5 micron) contains absorption features of ices such as H_2O, CO, CO_2 and CH_3OH. While ground-based telescopes and *Spitzer Space Telescope* have already detected ices in disks [1][2][3], *AKARI* is an unique telescope which enables us to observe the full NIR wavelength region towards low-mass YSOs. We selected several edge-on disks around Class I-Class II YSOs, and detected several ice absorption bands towards Class1 source IRAS04302+2247 and IRAS04368+2557(L1527) in Taurus star forming region (Fig1). We derive the ice composition in these objects by comparing the absorption feature with laboratory data (e.g. [4])

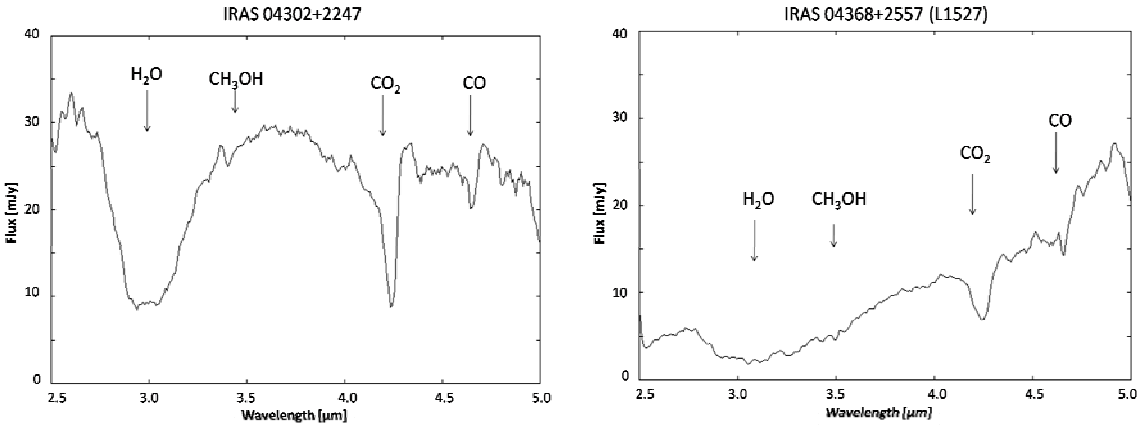

Fig 1 : Our sample of AKARI spectra.This plot is Flux[mJy] vs wavelength [μm].
Left is IRAS04302+2247,right is IRAS04368+2557 (L1527).Especially,a deep H_2O and CO_2 ice absorption seen these spectra.

References

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