AKARI observation of interstellar ice

Yuri Aikawa[1]; Itsuki Sakon[2]; Motohide Tamura[3]; Munetaka Ueno[4]

[1] Dept. Earth and Planetary Sciences, Kobe Univ.; [2] Dep. of Astronomy, Univ. of Tokyo; [3] Opt/IR, NAOJ; [4] Dept. of Earth Sci. and Astron., Univ. of Tokyo

In molecular clouds, protostellar envelopes, and protoplanetary disks, a significant amount of Oxygen, Carbon and Nitrogen is in the form of molecule in ice mantle, such as H_2O, CO, CO_2, NH_3 and CH_3OH. These icy materials are formed by adsorption of gas-phase molecules onto grain surfaces and/or grain-surface reactions of the adsorbed species. Molecular evolution in the gas phase and ice mantle depends on the physical conditions such as temperature, density, and UV intensity. In order to understand the chemical processes of interstellar matter, it is important to observe the composition of gas and ice in various conditions. Composition of ice has been investigated by the absorption feature in the infrared. Spatial distribution of ice composition and its dependence on physical conditions are less constrained than the gas-phase molecules, because of the limited number of bright light sources behind or within the molecular clouds. In addition, some important bands cannot be observed from the ground.

We have observed near-infrared (NIR) (2.5 5micron) spectrum of background stars and young stellar objects (YSO) using {i}AKARI{/it} satellite. AKARI can observe the full NIR wavelength region towards faint background stars with ¥ge a few mJy at NIR. Spetroscopic resolution (R) is about 135. We have detected absorption bands of H_2O, CO, and CO_2 towards field stars and Class 0 YSOs. Using 2MASS catalog and color-color diagram, the visual extiction (A_v) of the observed field stars are found to range from 10 mag to 25 mag. Column densities of ice and their relative ratios are estimated by comparing the observed absorption bands and CDE (continuously distributed ellipsoids) model absorption.