P15a **Abundant CH_3OH in the Cold Starless Core TMC-1**

相馬 達也 (東京大学)、坂井 南美 (東京大学)、渡邉 祥正 (東京大学)、山本 智 (東京大学)

CH_3OH is thought to be produced mainly on grain mantles, and released into the gas phase by various star-formation activities. Since its abundance is apparently enhanced in the shocked region such as L1157B1, CH_3OH is sometimes used as a shock tracer. However, CH_3OH is moderately abundant even in cold starless cores like TMC-1 ($T_k \sim 10$K), although no heating sources are embedded there. Since evaporation temperature of CH_3OH is about 100 K, existence of CH_3OH in TMC-1 is puzzling.

Recently, we have conducted high velocity-resolution observations of CH_3OH toward TMC-1(Cyanopolyyne Peak; CP). We have found that the line shape of CH_3OH is much different from those of other carbon chain molecules. We have also conducted mapping observations of CH_3OH ($J_k = 2_k - 1_k$), $C^{34}S(J = 2 - 1)$ and $C^{18}O(J = 2 - 1)$ around TMC-1(CP), and revealed that the distribution of CH_3OH is anticorrelated with that of $C^{34}S$. This difference would be an important clue to understand the mechanism of CH_3OH production.

We are considering two possible mechanisms for CH_3OH desorption from grain mantles in starless cores. One is soft shock caused by collisions of small clumps inside the core and/or accretion motions of envelope materials onto the core. The other is desorption by cosmic-ray induced UV. In any case, the distribution of CH_3OH would not follow the distribution of the dense gas (*i.e.* CS), being consistent with our observation. It seems likely that the molecular composition in the gas phase would be affected by non-thermal desorption processes of grain mantles in starless cores.