P131b Relationship between Chemical Evolution of Carbon-Chain Molecules and Physical Evolution in High-Mass Star-Forming Regions

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Carbon-chain molecules are well known as good chemical evolutional indicators of starless cores and star-forming cores in low-mass star-forming regions, but the relationships between chemical evolution and physical evolution have not been studied well. In addition, there are few studies about observations of carbon-chain molecules toward high-mass star-forming regions, in contrast to low-mass star-forming regions. We carried out survey observations of HC_3N and HC_5N at the 45 GHz band toward 17 high-mass starless cores (HMSCs) and 35 high-mass protostellar objects (HMPOs) with the 45-m radio telescope of the Nobeyama Radio Observatory. We find a positive correlation between the integrated intensity of HC_3N and 1.2 mm continuum flux in both HMSCs and HMPOs, which means that HC_3N is a dense gas tracer. The fractional abundances of HC_3N and HC_5N are higher in HMSCs than in HMPOs, which suggests that both species decrease in star-forming cores, as well as low-mass star-forming regions. We also recognize a negative correlation between the column density of HC_3N and the luminosity-to-mass ratio (L/M), which is a parameter for the age of cores. The results also suggest that HC_3N is destroyed by UV radiation from the IRAS sources, as generally considered.